THE COLLEGE OF ST. CATHERINE

CONSUMERS' RESEARCH

INCOMPLETE FILE

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May 1947

CONTENTS

For the Home

Fluorescent Lamps — II..... 15
Flasheat Electric Water Heater..... 18
Two Frozen-Food Utility Carriers..... 19
Fire Extinguishers — III..... 22
Fuel Oils..... 32

Radios and Record Playing Equipment

Two Radio-Phonographs, Two Audio Amplifiers, Portable Record Player, Three Record Changers..... 8
Wear of Phonograph Records..... 29
Reprint on "High Fidelity" Available..... 33

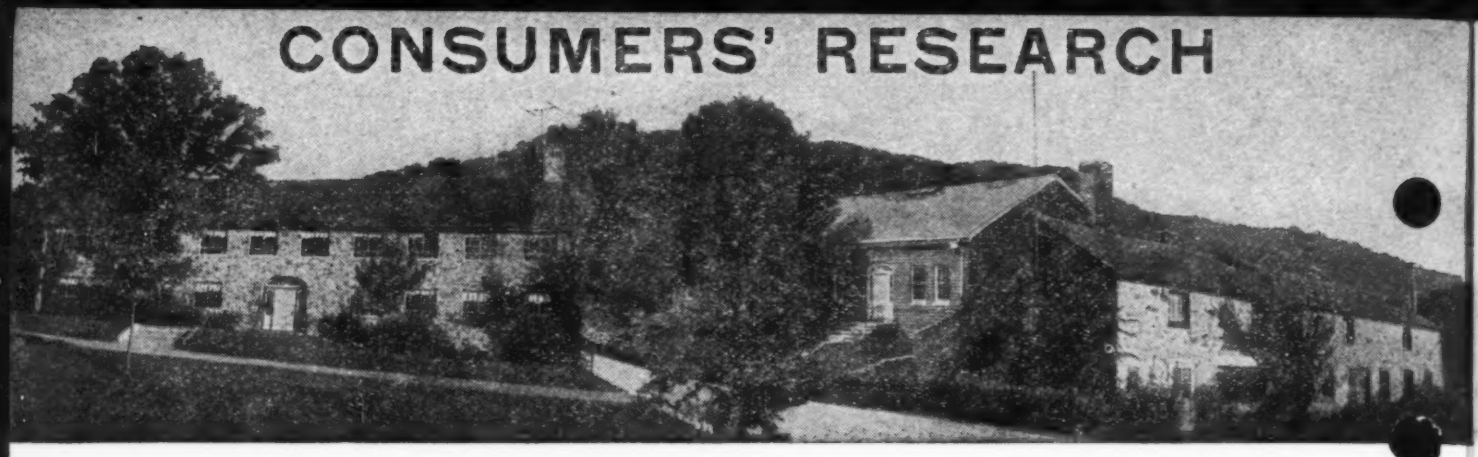
Miscellaneous

Vaporizers and Bottle Warmers..... 5
"Pictures in One Minute"..... 14
"Immediate Delivery" on Appliances..... 26
Prestone Motor Oil..... 27

Features

Off the Editor's Chest..... 2
The Consumers' Observation Post..... 3
Brief 1947 Cumulative Index..... 34
Ratings of Motion Pictures..... 35
Phonograph Records..... Walter F. Grueninger 39

CONSUMERS' RESEARCH



Vol. 19 • No. 5 **BULLETIN** May 1947

Off the Editor's Chest

CONSIDERABLE irritation was engendered the latter part of February by predictions from both the U. S. Department of Agriculture and the Department of Labor that living costs, particularly the costs of food, would climb to new highs in the coming months. There was some talk of dollar-a-pound pork chops, but it was quickly pointed out that with ample supplies of beef available, thrifty housewives would solve that problem by the simple method of not buying pork until prices came down. It is to be expected that pork will be scarce and expensive until the fall pig crop comes to market. The wide publicity given the prospect of having to allot a larger slice of the family budget for food, however, gave thoughtful listeners cause to wonder. Was the U. S. Department of Agriculture deploring the fact that prices for food were going to reach a new high, or boasting of its services to the farming population?

Consumers whose only contact with food price trends is their awareness of the amount of money from the weekly pay check spent at the grocery store and butcher shop probably do not realize that for at least the past fourteen years it has been official government policy to raise farm prices, and to support them by "market manipulations" against price declines, when threatened.

The Agricultural Adjustment Act, passed in 1933, set up the Agricultural Adjustment Administration to pay farmers for *not* producing and for keeping their lands idle. The ill-advised killing of some six million pigs in order to *increase the price of pork* was one of the first official steps to carry out the policies of the A.A.A. The various schemes sanctioned by this Act were not particularly effective in raising farm prices, and many A.A.A. activities were brought to an end in 1936 when the Agricultural Adjustment Act was declared unconstitutional by the Supreme Court as an unwarranted extension of the powers of the federal government.

Subsequently, other methods of accomplishing the desired results were evolved, and with the advent of the second world war the problem became not so much one of restricting particular crops as stimulating production of certain specially needed foods. In order to provide government incentives for such increases, the Steagall Act was passed which authorized price support on certain important agricultural commodities "for the duration" and two calendar years after the formal declaration of the end of hostilities. Under the provisions of this Act, the U. S. Department of Agriculture recently spent 80 million dollars of taxpayers' money to get rid of a 100-million-bushel potato surplus in order to maintain higher prices for potatoes than would have prevailed in a free market. In other words, consumers not only *paid more for potatoes* than the state of supply and demand warranted, but they also subsidized the *destruction* of surplus potatoes (so that they could not enter into human consumption, for which they had been grown) and subsidized, too, the operations of those who helped maintain the higher prices. Governmental action has also been effective in maintaining at high levels, and against the market forces making for lowered

(Continued on page 34)

Scientific and Technical Experts and Editors: F. J. Schlink, R. Joyce, M. C. Phillips, Helen P. Alleman, A. R. Greenleaf, and Charles L. Bernier. Editorial Assistants: Mary F. Roberts and B. Beam.

Symbols used to indicate sources of data and bases of ratings: A—recommended on basis of quality; AA—regarded as worthy of highest recommendation; B—intermediate with respect to quality; C—not recommended on basis of quality; cr—information from Consumers' Research's own tests or investigations; 1, 2, 3—relative prices, 1 being low, 3 high. Note that price and quality are completely differentiated in CR's listings; **a quality judgment is independent of price**; 46, 47—year in which test was made or information obtained or organized by the staff of Consumers' Research.

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¶*CR will, of course, gladly change addresses for men and women in the services as often as required by changes in station and other circumstances.*

★★★For a brief cumulative index of 1947 BULLETINS preceding this issue, see page 34.

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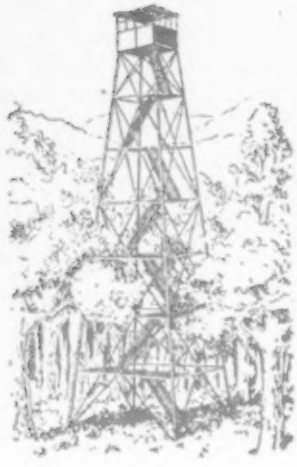


The Consumers' Observation Post

BALL-POINT PENS continue to be sold in large numbers in spite of the fact that many are defective and fail to work from the first. Another difficulty reported is that the new pens sometimes ooze ink all over hands and paper. In CR's tests, it was found that the writing from such pens was usually uneven in quality, and the ink in most cases was extremely fugitive, fading in a very short time when exposed to sunlight or strong light. From a high of $12.50, pens of Reynolds make have come down to $1.69 and $2.69. In a recent price war between Gimbel's and Macy's, in New York City, prices went even lower. Since it is estimated that it costs about 33 cents to manufacture these pens, it is obvious that purchasers who paid the top price could hardly be said to have gotten their money's worth.

* * *

HAZARDS TO HEALTH from use of fruits and vegetables sprayed with lead and arsenic insecticides were the subject of many a CR warning ten years ago. Although there was an occasional protest against our admonitions, particularly from those in close touch with West Coast fruit growers, CR's findings came to be widely accepted. In time agricultural laboratories undertook the problem of devising methods of reducing the amount of spray residues on fruits and vegetables. Although the residues from such sprays are still something of a hazard to health, there is a decided trend away from their use; in large measure this is not on account of the danger to consumers of fruits and vegetables but because current researches indicate that arsenical sprays injure the soil and impair the quality of fruit.

* * *

BUILDING COSTS are much too high, and many prospective builders will hold on to their money this next year. Materials are available, but sell for almost double pre-war prices. Lumber is fairly plentiful, but glass, bathroom equipment, sewer and soil pipe are still in short supply. Paint stocks are low due to the shortage of oils, but there is no lack of wallpaper, although there are not so many patterns to choose from as in pre-war days.

* * *

INSANITARY CONDITIONS in restaurants, cafeterias, and taverns are being revealed by investigations of big city health departments. In Chicago, for example, ninety-nine percent of the eating establishments inspected violated the sanitary code with respect to disinfection of dishes and utensils. More than ninety percent violated other provisions relating to cleaning of dishes and equipment, or did not provide adequate toilet facilities. Programs for seeing that their city's eating places are cleaned up by the proper health authorities might well be included on the agenda of women's organizations and service clubs this next year.

* * *

MEN AND WOMEN of 60 and over are likely to eat too much starch and sugar, according to Dr. C. Ward Crampton, former chairman on preventive medicine of the New York County Medical Society. Dr. Crampton holds that people who are growing old do not get enough calcium, iron, and protein, and advises more meat to prevent the anemic condition frequently characteristic of older folks. In his opinion, protein deficiency probably accounts for most kidney, liver, and blood diseases. Beet greens, spinach, cocoa, and rhubarb are not recommended for those who are of middle age or over because of the oxalic acid content which acts as a binding substance to prevent the body's absorption of calcium.

HIGH PRICES OF SPRING CLOTHES have been a topic of constant complaint. Retailers who are becoming worried about pricing themselves out of the market are advised by a clothing trade journal to point out to their irritated customers that the $1.35 and $1.65 shirts are not available because mercerized and sanforized cotton piece goods that used to sell for 12 cents to 17 cents a yard now cost the shirt manufacturer 43 cents to 49 cents a yard. Collar and cuff linings once around 40 cents are now $1.50. Other items are up in price. Labor whose pay used to average around 43 cents an hour now receives over 80 cents. Whatever the retailer's justification, however, the fact remains that if consumers keep their purchases of the present high-priced garments to a minimum, enterprising manufacturers will eventually find ways to produce needed clothing at lower prices.

* * *

MAGNESIUM, which is a light and durable metal, is expected to be widely used for a number of home utensils and garden tools. Unfortunately, the prices of items now making their appearance are so high that only the "station wagon set" can afford to buy them. Stumpp & Walter, a large New York garden supply house, and a well-known Brooklyn department store with a chain of stores in the city and the suburbs have been advertising a magnesium wheelbarrow at $34.50. The item is no doubt available in other large cities throughout the country. Its advertising boasted of the light weight of the appliance which is "only 14 pounds" and a little mental arithmetic indicates that at this rate the magnesium product sells for over $2 a pound. Present prices of magnesium sheets are something like 60 cents to 80 cents per pound. The spread between the cost of the basic metal and retail price of the wheelbarrow, which is very cheaply manufactured and assembled, seems a bit too high if the promoters wish to encourage wider use of this very conveniently light metal.

* * *

MUSHROOMS, once thought to be chiefly a source of zest and flavor in foods and sauces, are now known to have definite nutritive values. Studies carried on in the laboratory of the Massachusetts Agricultural Experiment Station under the direction of William B. Esselen, Jr., and Carl R. Fellers indicate that mushrooms contain all of the essential amino acids, at least in small amounts. They compare favorably with many fresh vegetables in protein content and provide additional sources of iron and copper. They are excellent sources of the B-vitamins riboflavin and niacin and are a good source of pantothenic acid, another of the B group. They also contain appreciable amounts of thiamin and biotin. The vitamins of mushrooms are well retained during cooking.

* * *

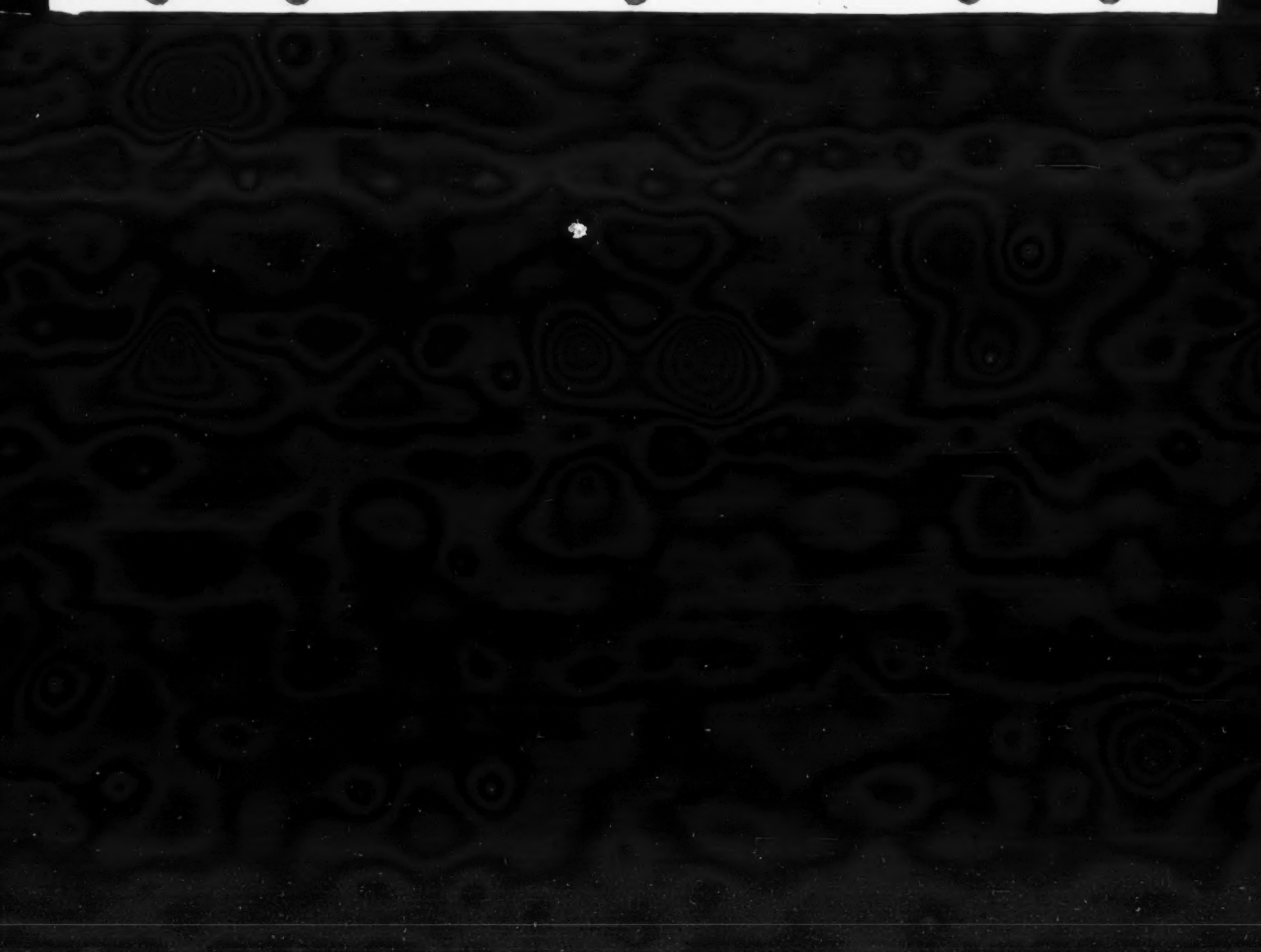
AUTOMOBILE PRODUCTION is vitally related to the availability of a number of kinds of steel, and the shortage of certain types, in addition to strikes, has been one reason for the difficulty in maintaining output of automobiles at the hoped for level in the past months. As some of our readers well know, many dealers are still not receiving deliveries of cars, or deliveries of only a few cars come in after very long intervals. The average car contains 3500 pounds of steel, of which 2600 pounds is sheet and strip steel; 613, hot and cold rolled bars; 187 pounds of wire (including wire in tire beads); 45 pounds of plates; 30 pounds of steel "shapes"; and 10 pounds of pipe and tubes. Sheet and strip are the type of steel used for bodies and stampings.

* * *

NEW OR NEWLY AVAILABLE: Compax Folding Bicycles are now available from Davega, 111 E. 42 St., New York City (for mail orders), at $49.35 for the lightweight model, $52 with balloon tires. These bicycles, said to have been used by paratroopers during the war, are constructed in two parts connected by a special locking arrangement, which permits taking the bicycle apart so that it can conveniently be stored in a small space, e.g., an automobile trunk. Following tests of this bicycle made in 1942, this make was given a B rating. It was considered to be of satisfactory quality and only slightly less desirable for persons of normal weight than the standard bicycles, such as the Iver Johnson ($44 at that time), which received an A-Recommended rating.

Sun Glow Hair Conditioner (Mfr., S. Bonat & Brothers), selling at $1 for a pound jar, is a creamy pink substance with lustrous sheen, labeled as con-

(Continuation of this section is on page 37)



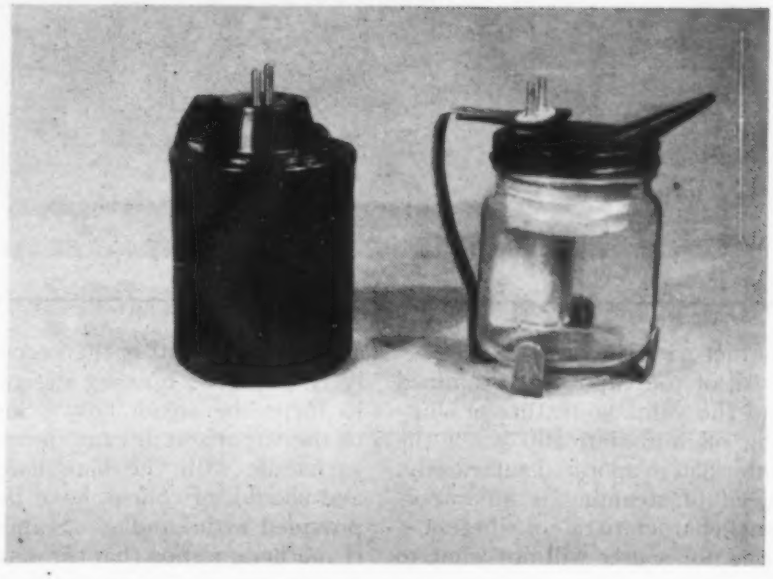
Vaporizers and Bottle Warmers

Vaporizers

THE use of warm vapor for the relief of discomfort due to certain nose and throat conditions has long been a recognized procedure in home medicine. A generation or so ago, when a child developed croup or a grown-up had a bad cold, a steaming kettle was used to vaporize certain medicaments, and so furnish relief from the unpleasant sensation in the nasal passages; where the condition was of the recurring type, this equipment was kept ready for use as needed.

The electric vaporizer is a modern answer to the demand for this type of treatment, and replaces the inconvenient and bulky teakettle by a simple, easily-used appliance.

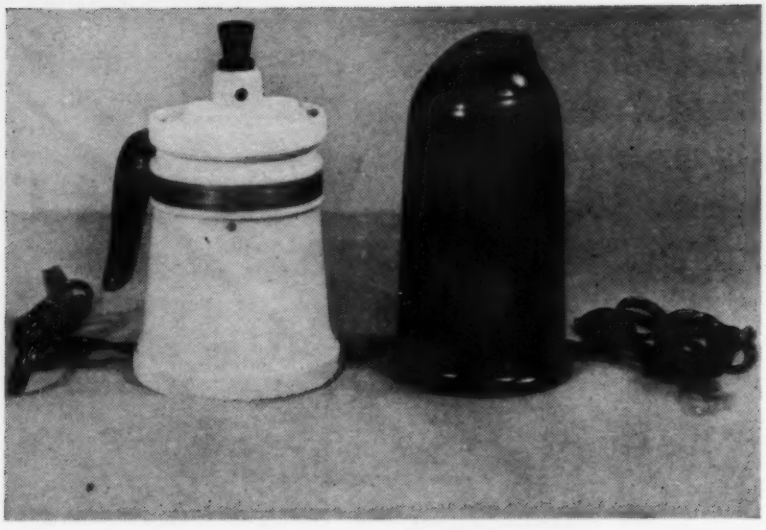
A number of vaporizers have been accepted by the Council on Physical Medicine of the American Medical Association for use, under the direction of a physician, in the application of medical substances to the nose and throat. It may be assumed that this acceptance recognizes a degree of effectiveness in such equipment when properly used under medical supervision; however, the medical value of these appliances will not be considered in this article for that is a matter for the physicians. (It should be noted, however, that the inclusion of some patented nose drop mixture as part of the vaporizer's accessories tends to suggest that the device and its promoters are engaged in the patent medicine trade rather than in supplying a necessary "ethical" service to consumers.) Marketing of such devices should be under strict control on account of the consumer's tendency to believe that he can cure or prevent colds by inhaling "medicated vapors."



Electric Vaporizers: *Prak-T-Kal*, Model 600 *Kaz*, No. 45

The present study by Consumers' Research was undertaken solely from the standpoint of judging the vaporizers on the basis of safety and convenience.

Those vaporizers found to be in wide distribution were purchased for study. Each consisted of a reservoir to hold water, and a heating unit made up of two electrodes (either carbon or metal) which made contact with the water to complete the circuit when the device was plugged into the power outlet. The reservoir in all cases was filled by removing the top cover. In three vaporizers the electrodes were at the bottom of the reservoir and there was nothing to prevent the user from lifting the lid and inserting a finger to see if the water was getting hot. As the water was part of the live circuit, a shock could occur if some part of the person's body were in contact with a grounded metal article, or with a damp floor through bare feet, or shoes with wet or damp soles. Two vaporizers were so designed as to avoid this hazard. These were the *Prak-T-Kal* and the *Kaz*; in them the removable top was the part carrying the electrical terminals, and no harm could therefore be done by touching the water with a finger because the water could not be reached except by removal of the top containing the electrodes, which would leave the circuit "dead." Unfortunately, on both vaporizers the design for safety was left somewhat incomplete, for on both, terminal pins were unguarded and it was possible (though it would be rather difficult) to get a shock or burn while attaching the appliance plug, if fingers should make



Hankscraft Vaporizer Major, Model No. 891 *DeVilbiss*, No. 148

contact with the pins.

All of the vaporizers examined had the valuable feature of shutting off automatically when the water had evaporated sufficiently. Speed of steaming is an important characteristic of these devices, for a user will not want to wait longer than necessary for steaming to begin. The time required to produce steam was surprisingly short in some cases, and ranged from one to about five minutes using tap water. The steaming time was quite uncertain for those varporizers for which the addition of a "pinch" of salt was advised, since "pinches" vary considerably in size and the more salt the "pinch" contained the shorter the warm-up time; an excess, however, could produce a too violent boiling action, so caution must be used. To be useful, the flow of steam should continue for a considerable time.

In any vaporizer the lid should fit tightly enough to prevent overflow and splashing, which could cause damage to the table top or other supporting surface and reduce the effectiveness of the steam flow from the outlet. Though the design of the orifice of such a vaporizer would seem to be a very simple problem, in several examined, the steam escaped all around the joint between the top and the body, rather than exclusively from the opening designed to focus the steam flow. Some of the vaporizers became too hot to handle with the bare hands, and should, of course, have been provided with handles. Stability is another question that the manufacturers needed to give attention to and did not in some cases, since a vaporizer that could tip over easily could scald one's hands or even a child in bed near by—a very important matter since an appliance of this kind is very often used near a person who is weak or helpless. The purchaser should look for a short, stubby, large-diameter vaporizer with a broad base, rather than a tall one.

Measurements made to determine the time required to bring the water to a boil varied greatly (from 45 seconds to 15 minutes) with the particular appliance and the hardness of the water used, and whether salt was or was not added. The devices work much more quickly when used with hard (or moderately hard) water, or with a little salt added; with quite pure water, or rain water, the operation will be quite slow. Figures for time to produce steam, and duration of steaming, in listings, are only very rough, on account of these variable factors.

Because of their shortcomings, none of the vaporizers included in this study can be rated higher than *B. Intermediate*, although it would take only slight and inexpensive changes to develop two of them into very good appliances of their type. Ratings are cr47.

B. Intermediate

Prak-T-Kal, Model 600 (Practical Electric Products, Inc., New York City) $1.95. Black plastic straight-walled cylinder reservoir with upper rim threaded; cover formed terminal block for heating element and was threaded for assembly with cylinder. Hand could not make contact with water while circuit was "live." Capacity, 8 oz.; water line marked by ridge on inside surface which was somewhat hard to see. Time required to produce steam approximately 1 minute. Duration of steaming, approximately 1½ hours. (According to manufacturer's directions a "pinch" of salt should be added whenever steaming action fails to start within 1 minute.) Steam easily directed as wanted. The appliance was easy to fill and to clean with the exception of the cavity designed to hold the medicament. Opening into this cavity was closed by a plastic push-plug which necessarily fitted very tightly to prevent escape of steam; this plug was very hard to remove and replace, and sometimes required the use of pliers, a distinctly disadvantageous feature. (A description sheet, since received, for a *Prak-T-Kal* also called Model 600, mentions a metal medication cup, chamber, and a metal spout cover, indicating a change in design since the one CR tested was made.) Terminal pins to power supply cord were unguarded, presenting a definite shock hazard. Outside body temperature of vaporizer remained well below 130°F and appliance could be handled without difficulty during operation. Leakage current was negligible. With guarded pins and proper design, and improvement of plug for medicament chamber, this vaporizer would warrant an *A-Recommended* rating. **1**

C. Not Recommended

Hankscraft Baby Bottle Warmer and "Baby Vaporizer," No. 1013A (Hankscraft Co., Madison 3, Wis.)

$1.95. Porcelain reservoir with loosely fitting porcelain top; terminal block was in base of reservoir; perforated porcelain disk formed protecting cover for exposed wires. Finger could be easily inserted into the water, a definite shock hazard. Capacity as vaporizer, 2 oz. Duration of steam flow short, about 15 minutes. Operation generally unsatisfactory. 1

Kaz, No. 45 (Kaz Manufacturing Co., Inc., N. Y. C.) $2, including 1-oz. bottle of *Kaz* medicament. Such appliances should not be marketed with patent-medicine type materials. Wide-mouthed screw-top, pint canning jar with metal top; top was poorly finished with black paint and had a 2½-inch spout for directing steam flow which showed rusting at one region. This assembly fitted into a metal carrying frame with handle insulated from the heated part of the top, which made handling easy, but care had to be exercised to prevent the hand from touching hot jar; some sort of shield would be a useful addition. The porcelain terminal block, suspended from the metal top, made it impossible to make finger contact with water while circuit was live. Time required to produce steam, between 4 and 5 minutes, with measure of salt added according to manufacturer's directions. Duration of steaming, about 40 minutes. Easy to fill; easy to clean, except that medicament oils may penetrate unglazed surface of medicament chamber. Terminal pins to power supply cord had unrounded ends (poor finish); no guard was provided, a distinct shock hazard, as noted in text. Leakage current excessive. 1

DeVilbiss, No. 148 (The De Vilbiss Co., Toledo, Ohio) $3. Black plastic; straight-sided reservoir, with terminal block in base, and plastic base plate. With this appliance, it was easy for the user to insert finger to test temperature of water while circuit was "live," and so get into contact with the live circuit; electrodes themselves, however, could not be reached by the fingers. With pinch of salt added according to manufacturer's directions, the time required to produce steam was approximately 2 minutes. Duration of steaming, about 25 minutes. Operation of this vaporizer was generally unsatisfactory; the addition of too much salt caused excessive boiling action; even with a moderate amount of salt added, the water boiled out around the top, necessitating protection for the supporting surface. 2

Hankscraft Baby Bottle Warmer and "Baby Vaporizer," No. 1013A

Hankscraft Vaporizer Major, Model No. 891 (Hankscraft Co.) $3.95. Tapered porcelain reservoir with loosely-fitting porcelain top. Terminal block was in bottom of reservoir covered by perforated porcelain disk. Finger could be easily inserted into the water, a shock hazard. Capacity about 6 oz. Duration of steam flow, about 25 minutes; this would vary with amount of water. Easy to fill and clean. 2

Bottle Warmers

A vaporizer, providing it is of the type having its heating unit in the bottom, and if it has a large enough opening, can also be used for heating the baby's bottle. When used for this purpose, the amount of water involved is so small that the water level is below the protective disk usually used to cover the heating units; with this small amount of water, it would be difficult or almost impossible to receive a shock when using the appliance.

In view of the fact that the units with heating elements in the top are more desirable as vaporizers, it does not seem wise to purchase a large-mouthed one with bottom heating element for the dual purpose, for it is judged that the little units especially designed for bottle warming are more practical. These furnish directions for the use of just about enough water to permit functioning for sufficient time to heat the bottle before shutting off. The *Hankscraft* Bottle Warmer and "Baby Vaporizer," for example, operates for 5 minutes or so on one teaspoonful of water, when it automatically shuts off. The user must see to it that the bottle temperature does not rise much above body heat (98°F) judged most suitable for baby's milk. This can be checked by trying a few drops on the wrist.

Two Radio-Phonographs, Two Audio Amplifiers, a Portable Record Player, Three Record Changers

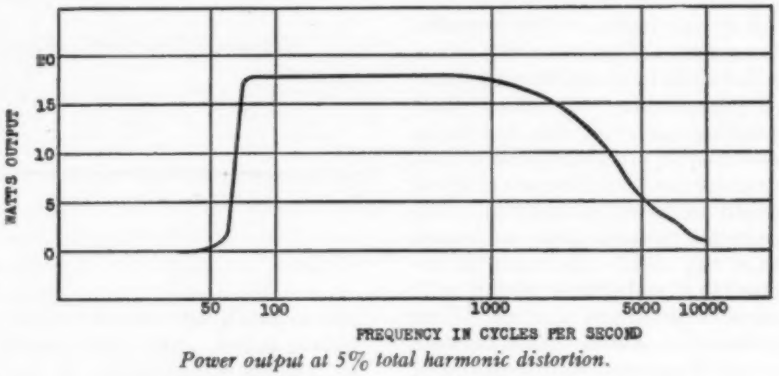
and a brief comment on a small crystal receiver

Two Radio Phonographs

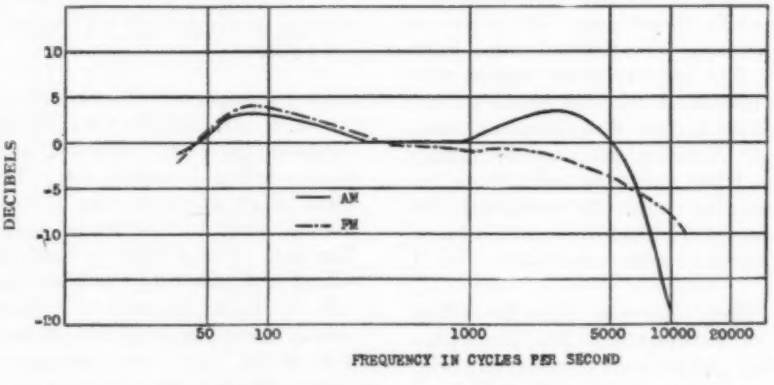
ANYONE purchasing or even contemplating the purchase of a very expensive radio-phonograph combination, say one in the $500 to $1500 class, will surely have a strong desire to know just what he is buying. This is especially true when one considers that such combinations fall in the price range of the lower-priced automobiles, and represent a big expenditure, for anything with such a high rate of obsolescence as a radio-phonograph in these times. For this reason, the present report on the *Scott*, Model 800-B, is written at greater length than our usual reports on radio-phonographs.

The *800-B Scott* is a superheterodyne with 24 tubes (including rectifiers, voltage regulator, tuning indicators), which covered the broadcast (AM) band from 540 kc. to 1600 kc., the short-wave band from 5.9 mc. to 18.2 mc., and the FM band from 88 mc. to 108 mc. The circuit consisted of a tuner for AM and a separate tuner for FM; these were fed into a common audio amplifier. The AM tuner consisted of one r.f. stage, a mixer, a separate oscillator, two i.f. stages, and the detector stage.

The FM tuner consisted of an r.f. stage, a mixer, a separate oscillator, two i.f. stages, two limiter stages, and a discriminator stage. The r.f., oscillator, and mixer stages in the FM tuner used the comparatively new high-frequency type tubes.



Power output at 5% total harmonic distortion.



Curves representing the operation of the Scott *with the amplifier set for approximately "level" response, and producing 0.5 watts output at 400 cycles. (Both tone controls at maximum, with selectivity switch at* medium *position. A different position of the tone controls would have given what is called "flat" response.) The downward trend of the dotted curve is intentional, to correct for pre-emphasis of highs at the FM transmitter.*

* * *

In addition to the above curves, data were taken and curves drawn showing (1) operation of the set with the tone controls at maximum position for the broad *and* sharp *positions of the selectivity control; (2) the response with bass and treble controls in minimum position; (3) the phono-output characteristics measured electrically and acoustically; (4) the percent distortion at various output levels from 1/2 to 20 watts for different audio frequencies (40, 400, 4000 for AM and 400 for FM); (5) the automatic volume control action for AM between 15 and 1,000,000 microvolts input; (6) the FM limiter action for an r.f. noise (extraneous interference) between 1 and 100,000 microvolts; and (7) the curves showing deviation from linearity at various output voltages for kilocycle deviations (FM) from 10 to 100.*

The audio amplifier consisted of two stages of resistance coupled audio amplification, a phase inversion stage which fed into a pair of "Beam Power" amplifier tubes (6L6G's) which were operated in push-pull. (Such tubes are not the most desirable for output-stage use in sets that are intended to provide high-fidelity audio response.) The power supply was of the heavy-duty type and used two rectifiers and a voltage regulator tube (gas filled) to stabilize the oscillator plate voltages in both the AM and the FM tuners so that variations in line voltage would not impair the accuracy of the frequency setting of the oscillator circuits. The output of the amplifier was matched to a *Jensen* type JAP Coaxial loud-speaker (15 inch) which has a built-in separate "tweeter" for reproducing the higher frequencies. The "tweeter," however, was not operative in the circuit when the phonograph was being played; it should have been, as the best recordings require that wide-range audio response be available when desired. (AM broadcasting at present is almost invariably so poor that a wide-range [two-unit] speaker is not needed or desirable to handle it.)

The phonograph section consisted of a *Thorens* record changer (made in Switzerland) with a capacity of ten 10-inch records or eight 12-inch records or 8 of mixed sizes (10 in. and 12 in.). The pickup used an *Astatic L75A* cartridge with an *Astatic Nylon*-shank sapphire needle. There is not sufficient information in hand to permit judgment of the probable performance and lasting qualities of the *Thorens* record changer and turntable.

The components of the radio-phonograph were mounted in a well-constructed wooden console which was executed in the Chippendale pattern and was 38½ in. high, 44 in. wide, and 22 in. deep.

A. Recommended

Scott, Model 800-B (Scott Radio Laboratories Inc., 4541 Ravenswood Ave., Chicago 40) $1175 in Regency or Chippendale, $1280 in bleached mahogany. 117 volts, 60 cycles. Full-size console model for AM and FM, equipped with automatic record changer and record player. 24-tube superheterodyne circuit (including 2 rectifiers, a voltage regulator, and 2 tuning indicators) with *separate* AM and FM tuners (preferable to the use of "mixed circuits"). Had manual and push-button tuning for both AM and FM. Sensitivity excellent, selectivity good, on both AM and FM. Power output, as measured, 0.35 watts at 50 cycles, 18 watts at 400 cycles, 5.3 watts at 5000 cycles—all measured with 5% distortion. Output when FM tuner was used was somewhat greater at upper audio range (3 watts at 10 kc.). Maximum power output, 20 watts with large distortion—15% (output apparently limited intentionally to suit power-handling capacity of the speaker). Apparent quality of parts and workmanship very good; for example, air-dielectric trimmers were used in place of the mica type ordinarily found in radio receivers. FM limiter circuit effective down to 10 microvolts (excellent). Power input transformers were fuse-protected with consequent reduction in fire hazard. The AM circuit incorporated three-step variable selectivity i.f. circuit which was controlled by a panel switch for broad, medium, and sharp tuning. Record changer apparently well built; was equipped with reject, start, stop, repeat, and pause controls. Automatic tuning device was motor driven and ruggedly built. Both manual and push-button control were provided for AM and FM. Base and treble boost or attenuate circuit incorporated, which was controlled from front panel. AM section was equipped for use with loop antenna. Provision made for separate AM and FM antennas (very desirable). No separate antenna was supplied for use with FM. Accessibility for servicing, good. Acoustical quality good, with some high frequency distortion apparent. No spurious responses noticed. Automatic volume control action only fair. Leakage current 2.5 ma. from chassis to ground (high). No Underwriters' label attached. Because of the use of relays, and many mechanical devices in this set, it is felt that any purchaser would be wise to have it fully and carefully checked and cleaned periodically (say once per year) by a competent radio technician qualified to work on exceptional and complicated receivers.

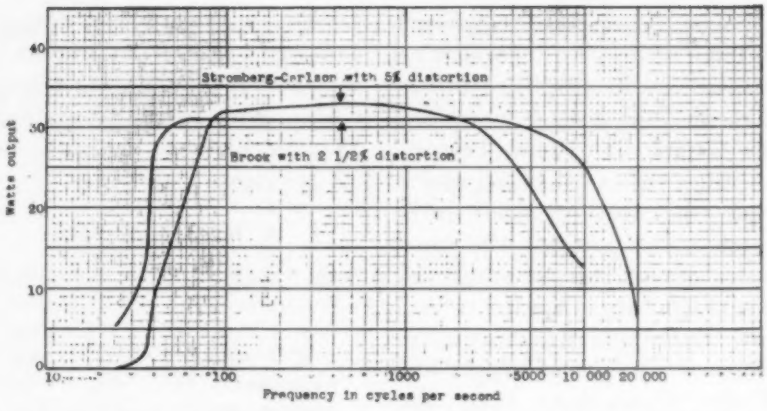
* * *

THE following listing of a *Magnavox* AM-FM-phono-receiver is preliminary and tentative.

B. Intermediate

Magnavox, Regency Symphony 155BF, Radio Phonograph Combination (Magnavox Co., Fort Wayne, Ind.) $492. Included two 12-in. speakers, and an automatic record changer, all mounted in a period cabinet. The three chassis used were: (1) an AM tuner with i.f. amplifier, (2) an FM tuner with i.f. amplifier, and (3) the output amplifier and power supply. The 21 tubes used included 3 rectifiers and 2 tuning indicators. The record changer was a *Webster*, an improvement on this maker's Model 56 (reported on elsewhere in this article), with "permanent" needle in *Astatic MLP-2* pickup. Tuning range covered broadcast band from 530 to 1610 kc., short-wave band from 4.9 to 18.1 mc., and FM bands 42.9 to 48.7 and 87.2 to 108.7 mc. On the AM chassis were the treble tuning control which incorporated a selectivity control for broad or sharp tuning; bass tone control, incorporating the power switch; volume control; band switch control for selecting short wave, regular broadcast, phonograph, or external FM tuner. FM chassis (complete in itself, with its own power supply) had two controls: a band switch in which was incorporated the on-off switch, and a tuning control. Used a single limiter stage; action of FM unit (limiter) poor, apparently defective in sample tested by CR. If this is found to be a defect of this particular sample rather than of the model, an *A* rating

for the set may be warranted later. Preliminary power output measurements of the push-pull-parallel transformer-coupled output circuit (using four 6V6's) showed 12 watts at 50 cycles, 14 watts at 60 cycles, and 18.7 watts at 400 cycles (all at 5% distortion). Speakers not considered fully satisfactory. Considerable feedback from tone arm on record changer when bass control was advanced too far; better isolation of phonograph mechanism and loud-speaker system would possibly correct this. 3



Measured power output over the audio frequency range for the Brook High Quality Audio Amplifier (*at 2½% distortion*) *and the* Stromberg-Carlson Public Address Amplifier (*at 5% distortion*).

Two Audio Amplifiers

BECAUSE there is such an intense interest evidenced in high-fidelity reproduction, in subscribers' correspondence, CR is continuing its reports on the various units necessary for attainment of good reproduction. Along with a superior radio tuner (or phonograph pickup) and speaker, a first-rate audio amplifier is necessary.

Present-day audio amplifiers which have the necessary characteristics, are expensive; in fact, some units will cost several hundred dollars.

In testing an audio amplifier, many features are taken into consideration before final judgment is passed. Among the questions to be answered are: (1) Is the voltage amplification sufficient to raise the input voltage to that value necessary to drive the speaker to a suitable volume of sound? (2) Does the voltage amplification vary excessively between the lowest and highest frequencies which one desires to reproduce —say 40 to 10,000 cycles? (3) Is the distortion introduced by the tubes and other components within a certain specified limit? (4) Is the hum produced by the power supply unit, and the background noise from various sources, excessive? (5) Is the voltage regulation good or do its variations produce noticeable changes or distortion in the output? (6) What are the good and bad features of the circuit as designed? and (7) How does it sound under actual listening tests? Because of the many features that must be checked, the actual testing is a time-consuming matter, often taking weeks to accomplish, before the notes are ready to be compiled into a report.

The two audio amplifiers reported on in this article are the ***Brook High Quality Amplifier*** and the ***Stromberg-Carlson P.A. Amplifier.*** From the standpoint of measurable electrical characteristics, the *Brook* amplifier was far superior to any amplifier tested to date. The power output curve with 2½ percent distortion (see Figure 1) was quite flat between 40 and 10,000 cycles and extended from 25 to 20,000 cycles. This range is considered ample to permit top-grade reproduction of any musical sound which it may be desired to reproduce. The curves which were plotted to show distortion characteristics as related to output (watts) indicated that the distortion at 40 and 400 cycles was quite small for various output powers up to about 30 watts. This suggests that the amplifier will give excellent reproduction over the exceptionally large output-power range of upward of 30 watts.

A very desirable characteristic of this amplifier was its use of three push-pull stages (preceded by a single-sided stage and an inverter stage). The amplifier operated as "Class A" up to about 5 watts and then went into class AB_2 operation up to its maximum power. A two-stage resistance-capacitance network connected by two 8-position switches was used as tone control to control the bass and treble emphasis.

A. Recommended

Brook High Quality Audio Amplifier, Model 10C2 (Brook Electronics Inc., Elizabeth, N. J.) $225 net. Required 165 watts at 120 volts input for operation with 30 watts audio output. Quality of parts and workmanship was excellent. 11 tubes used including 2 rectifiers and bias-control tubes. Three stages of push-pull amplification using 6B4G's (equivalent to 6A3's) in the final stage. Input impedance to preamplifier, 0.5 megohms; output impedances available, 1.5 to 30 ohms and 500 ohms, in 6 steps. (Optionally, 3 to 20 ohms, in 3 steps.)

Four controls on front panel including on-off switch, bass control, treble control, and gain control. Gain with 50 millivolt input, 85 db. Power output (with 5% distortion at 400 cycles), 31.4 watts. Output power considered quite sufficient for any normal use, with distortion exceptionally low. Tonal range 25 to 20,000 cycles (±1 db.). Hum level, with volume control at maximum setting, —60 db. (below an assumed output of 30 watts). ¶This amplifier was briefly and tentatively reported in our April BULLETIN. **AA3**

* * *

The following is a brief, preliminary listing of the ***Stromberg-Carlson Public Address Amplifier:***

A. Recommended

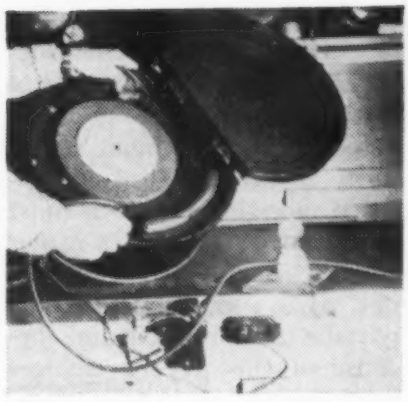
Stromberg-Carlson Public Address Amplifier, Model 33 (Stromberg-Carlson Telephone Mfg. Co., Rochester, N. Y.) $75. 8 tubes, 3 microphone channels, and 1 phonograph channel. Choice of 5 output impedances, 4 to 500 ohms. Tonal range, 20 to 20,000 cycles. Power output, 10 watts between 40 and 12,000 cycles. Noise and hum level —43, noise —48 db. Output stage consisted of 2 beam-power (6L6) tubes in push-pull circuit. Inverse feedback over last two stages. Parts of average quality; workmanship satisfactory. Fell considerably short of the performance of the *Brook* amplifier, but if not driven above 10 to 15 watts (and there would be little occasion to drive it at a higher power for home use), should give satisfactory reproduction. Power output with 5% distortion was 7.5 watts at 40 cycles, 31.5 at 400, to 25 at 4000. (At 25 cycles the output was reduced to 5 watts—at 10% distortion.) It is believed that this equipment will give satisfactory radio reproduction, but it may be a little deficient for good phonograph reproduction at the bass end, particularly where open-back speakers are used. (Phonograph reproduction requires more bass than music by radio, since the records do not carry a full recording of the bass (for mechanical reasons) but are "undercut," calling for a "boost" of the amplification in reproduction. This quality of the *Stromberg-Carlson* amplifier will be further investigated in a listening test not yet completed. **2**

Portable Electric Phonograph

DESIGNED perhaps especially with teen-agers in mind, the portable electric phonograph reported in this article was attractive and sturdy, and performed well enough possibly to be acceptable to the high school or college group. The appliance had one fault, however, that was invisible to the purchaser, yet none the less important, for it definitely lacked the degree of care for electrical safety which should be associated with every piece of equipment that connects to the power lines. In this record player, one side of the power line was directly connected to the chassis of the amplifier contained in the carrying case, and as mounting screws for this chassis passed through the panel on which the control knobs were located—some being only a few inches from the knobs—it was possible to make direct contact with live electrical parts. This was a bad fault, considering the possibility of the gadget's being used to provide the continual background of jive or swing which young folks often feel the need of, perhaps even out of doors and on damp ground. For years, CR has emphasized the importance of proper protection against fire and shock hazard in home appliances. (There is no way in which this can be brought about except by constant calling of attention to the faults of appliances which do not show proper consideration for the user's safety.)

C. Not Recommended

Lewyt, The Hat Box, Model 215AP (Lewyt Corp., Brooklyn 11, N. Y.) $41. Consisted of electric phonograph motor and turntable, pickup, 3-tube phono amplifier, and 4-in. permanent magnet speaker, all mounted in "hat-box" case. Case was very good; had black plastic covering with cowhide binding, red simulated leather lining; hardware mostly steel, brass finished. Quality of parts, including motor and pickup, judged good. Workmanship, good to average. Quality of reproduction pretty poor, but would possibly be satisfactory for anyone wanting to use a reproducer of this type chiefly to provide a rhythmic background without expecting good reproduction. Audio power output (electrical) much too low, being only about ¼ watt when measured at standard (5%) distortion levels. The pickup, a Shure Bros. Model P87B, had favorably low needle pressure—1¼ oz.—and was equipped with removable sapphire needle (a desirable combination). Provision for electrical safety, as already noted, very poor, as chassis connected to one side of power line, and chassis mounting screws were exposed on control panel; screws (and pickup arm) were "live" (110 volts) for one position of the plug. No Underwriters' label found. Open screened grille in case would permit entrance of rain when carrying the player, which would directly expose mechanism to wet conditions. The case of this portable phonograph included no space for carrying records.

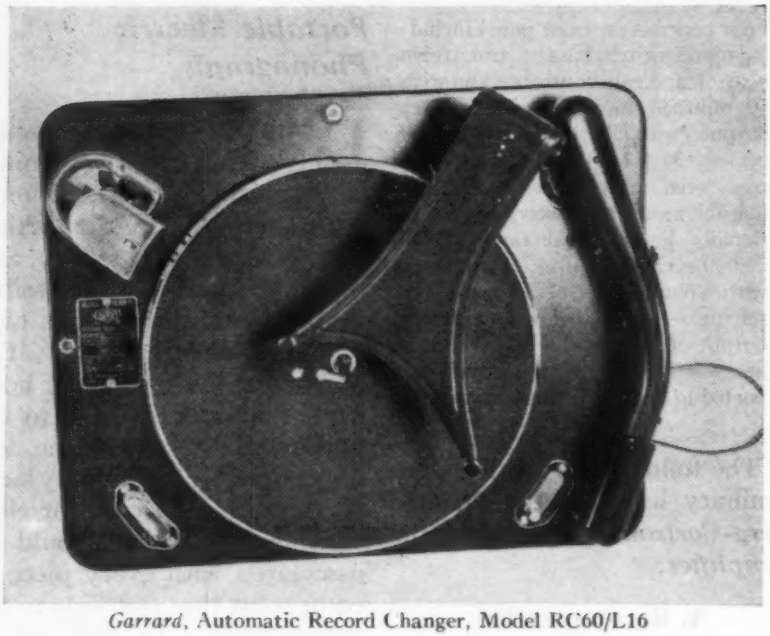


Lewyt Hat Box Record Player, Model 215AP

Three Record Changers

GENERALLY speaking, each record changer which we have studied and tested up un-

til this time, has had at least one major fault in its construction. By the very nature of the operation it has to perform, a record changer must necessarily involve a quite complicated mechanism, which must be designed to fit into a rather small space in a console or cabinet. The physical size of the parts is thus limited and, because of this, record changer mechanisms are easily damaged by incorrect use; manual interruption of the changing cycle is a frequent cause of trouble.



Garrard, Automatic Record Changer, Model RC60/L16

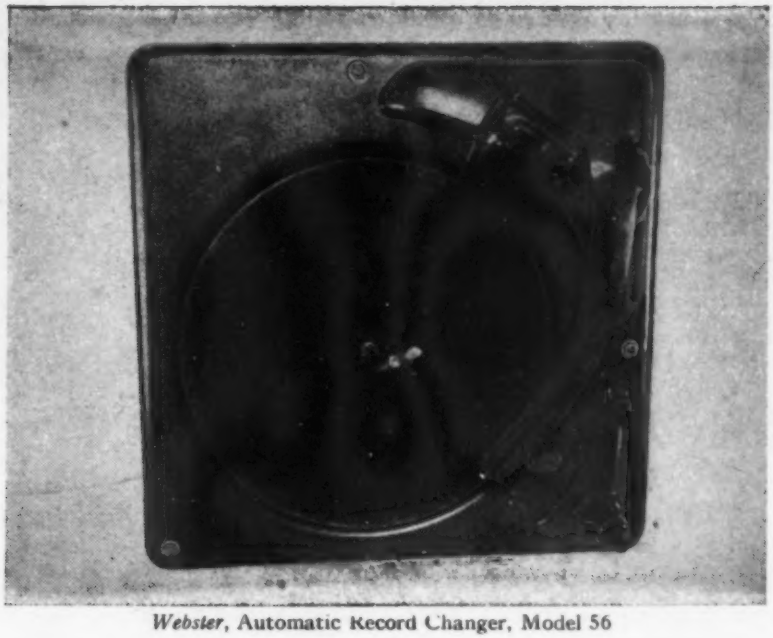
There are several disadvantages connected with the use of record changers, which should be enumerated. Some of the more important are: (1) They tend to cause high record wear, due to the fact that few, if any, needles which are well suited to good musical reproduction can be used without risk of some unnecessary record wear when the player is played with a load of records. (2) It is possible for records to be damaged by actions of the changer mechanism. (3) Some changers work well only with records which are free from warp (and many records are warped or otherwise non-uniform in some respect). (4) As designed at present, the regular changers are not able to play both sides of a given record in turn.[1] This necessitates the purchase of "automatic" record sets pressed in special sequence for selections recorded on more than one record side. (5) The unnecessary record wear caused by the difference in the angle at which the needle rests on the first and last record of a load being played. And lastly, if a "permanent" needle is employed, as is usually found most convenient by users of changers, it may be necessary to return the complete changer to the factory or to a serviceman for insertion of a new cartridge and stylus.

Detrola or *Utah*, Automatic Record Changer, Model 550

B. Intermediate

Webster-Chicago, Automatic Record Changer, Model 56 (Webster-Chicago, Chicago) $26.66. Measured power input, 18 watts at 122 volts. Overall size, 14 in. x 14 in. x 9 in. Will play twelve 10-inch or ten 12-inch records. Motor temperature rise (continuous operation), 45° (slightly excessive). *Astatic MLPI* cartridge with sapphire stylus. Needle pressure, 1½ oz. (considered slightly excessive, especially with sapphire stylus). Cycling time, 5 seconds. Tracking error, 7° maximum (fair). This record changer was improperly adjusted when purchased and repeatedly rejected records being played. There were

[1]Known exceptions at this time are the *Capehart* and the *RCA Magic Brain* which play either one or both sides of a record as selected.



Webster, Automatic Record Changer, Model 56

no instructions in the service manual concerning correction of the trouble, and it was therefore returned to the factory for correct adjustment. Following this, there was only an occasional rejection. This was not considered a serious fault. A very objectionable feature of this changer was that records had to be removed over a curved spindle. This resulted in considerable wear and elongation of the record centering holes. Changer mechanism was operated 6200 times during test without breakdown. This changer is believed to merit a *B-Intermediate* rating in view of the fact that the manufacturer has recently made provision for ready replacement of worn or damaged needles.

C. Not Recommended

Detrola or *Utah*, Automatic Record Changer, Model 550 (Utah Products, Chicago, or Detrola Radio Division, International Detrola Corp., Detroit) $18.27. 15 watts at 121 volts a-c. Overall size, 12⅛ in. x 10¾ in. Extends 5¾ in. above and 2 in. below mounting board. Motor manufactured by General Industries. Temperature rise of motor in use, 58°C. (A rise of 40°C is considered the maximum permissible for motors of this type running continuously.) Will play twelve 10-inch records or ten 12-inch records. *Astatic L70* pickup cartridge with *Fidelitone* 50-cent stylus. Needle pressure, 1¼ ounces (desirable). Cycling time, approximately 5 seconds. Was equipped with a white metal (alloy) bearing and what appeared to be a bakelite shaft. This bearing failed completely after 336 plays. The changer caused excessive needle wear. Had relatively simple mechanism and would have warranted a *B-Intermediate* rating with better (more durable) bearing design. Measurements of distortion and tracking error not taken. Tonal range, acceptable—from 80 to 6000 cycles (within 10 db.) with noticeable boost around 500 cycles.

Garrard, Automatic Record Changer, Model RC60/L16 (Garrard, Swindon, England) $63. Power input, 15 watts at 121 volts. Overall size 15 in. x 11¾ in.; 5½ in. above and 4½ in. below mounting plate. Motor temperature rise (continuous operation), moderate. Will play 10-in. or 12-in. records mixed in any sequence. *Astatic MLP-1J* pickup cartridge with sapphire stylus. Stylus pressure, 1 oz. (desirably low). Cycling time, approximately 6½ seconds. Maximum tracking error, about 9° (large). Frame and cams were made of white metal. Frame too weak to support full load of records. (Gradually sagged with use causing an annoying clicking noise.) Frame, however, was heavier than previously tested models. Changer caused more record wear than another changer (*Webster*) using a similar stylus. Tonal range of pickup (within 10 db.), from 50 to 4000 cycles per second and 7000 to 9500 with decided humps at 300 and 8000 cps.

A Small Crystal Radio Receiver—$3.99, But No Bargain

THE *Pa-kette* Radio is a small vest-pocket radio receiver sold by mail order from the Pakette Electric Co., Kearney, Nebr. The one tested by CR was bought through an advertisement in Popular Photography. Its price was $3.99, postpaid. This small radio uses a pre-set crystal as a detector and does not require tubes or batteries for operation. When tested, it was found to require from 0.2 to 0.6 volts input for satisfactory output to the ear of the listener. (A group of table-model radios of average sensitivity required from 0.00003 to 0.0001 volts for satisfactory output or say 1/10,000 as much as was required by the vest-pocket receiver.) The tonal quality was poor due to the use of an inferior headphone, which was built in. The selectivity was also poor and would tend to limit use of the device to areas having a single local transmitter. The company's advertisement stated that the set was "guaranteed to work for you in your locality if attached and used according to complete operating instructions sent with each radio." When tried in two locations, one approximately 12 miles and the other about 17 miles from the local station, not even a "peep" was heard, yet an antenna and ground, as recommended "for best reception," were used. It

is felt that this radio is definitely in the novelty or toy class and that purchasing one would be a waste of both time and postage for most people, and unless the prospective purchaser were located in the immediate vicinity of an isolated broadcasting transmitter, the device would not be serviceable at all.

"Pictures in One Minute"

The New Land Process

SOMETHING new in photography, or rather a new and ingenious application of known principles, was demonstrated at the February 1947 meeting of the Optical Society of America by Mr. Edwin H. Land of the Polaroid Corporation. In Mr. Land's process a finished print can be produced, without darkroom work of any sort, in one minute after exposure.

The camera contains a roll film on which the exposure is made, and a roll of photographic paper for the prints. The paper carries at regular intervals corresponding to the length of the picture, capsules or "pods" of the reagents required to perform the chemical operations, which are the equivalent of those performed in the darkroom in making negatives and prints by ordinary methods. After exposure, the negative material and the positive material are passed between two rollers which break the "pod" to release and spread the reagent, and to roll the two sensitive surfaces into contact with each other. The resulting sandwich is removed from the camera, and after one minute the two parts are peeled apart, and the finished picture is disclosed. The chemicals used include hydrochinon, hypo, a viscous material of high molecular weight, and presumably undisclosed materials. The process is claimed to be effective over a temperature range between 30°F and 100°F. Obviously it must be an accurately balanced process to produce acceptable pictures over this range of temperature, and to provide chemical means for neutralization of the fading properties of hypo.

The advantages of having a print in one minute are obvious, in many applications of photography. There are certain disadvantages also. As the process is described, both the negative emulsion and the positive emulsion are apparently coated on opaque material; this precludes the use of the negative for making additional prints or enlargements in the usual manner, or the use of the positive as a transparency for projection. It would of course be possible to make a "copy negative" from the print, and then to print or enlarge in the usual way, but that involves additional operations and the loss of some "quality" in the process, and is of course a serious offset to the advantages of "one-minute processing." The inventor, however, has announced that some of the processess available to him will produce a regular negative, permitting making additional prints by conventional methods. If this is done by the use of something like stripping film on an opaque backing, the same principle may be applied to direct production of positive transparencies for projection. That would be an important detail for color photographers. The resolving power claimed for the process so far is low—between 10 and 30 lines per millimeter; that will serve satisfactorily for contact prints, but would not be suitable for enlargements or for projected transparencies. The correct exposure is stated to lie within a range of two stops; this latitude is comparable with the familiar reversal process used in making color transparencies.

No announcement has been made as to the availability of cameras and material for the new process, but it is understood that the process will be promoted commercially. It may be many months, of course, before the method begins to be available to those prepared to pay the price for the special camera and materials involved.

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Fluorescent Lamps—II

THIS is the concluding part of the article which began in the February 1947 BULLETIN. Part I briefly discussed the operating principles and limitations of fluorescent lights and their efficiency, and their advantages and disadvantages as compared with standard incandescent lamps.

SINCE the fluorescent lamp is an arc discharge, it is a natural potential source of radio interference. Such interference may be air-borne or transmitted over the electric wiring (supply circuit). Because of the possibility of air-borne interference, it is desirable not to locate one of these lamps near a radio receiver or its antenna connection. In most installations the small condenser which normally is built into the starter serves to suppress the major portion of the noises. However, it sometimes becomes necessary to use an additional element, of the type normally sold for radio noise control, on the supply circuit to the fixture. Such an element connects to both supply wires and to the fixture frame (and ground). Where extremely low radio noise levels are required (as, for example, in regions where reception of one or more important stations is poor or unreliable, or other factors enter to make noise difficulties especially important), it probably is safer not to use fluorescent lighting in any fixture where the lamps are likely to be on during the time when good radio reception is important.

The ballast is only an auxiliary to the fluorescent lamp; its function is not at once evident and in most installations it is hidden away. This does not lessen its importance to the lamp, for the quantity of light delivered by the lamp and the probable life of the lamp are determined to a large extent by the ballast. Furthermore, certain characteristics of the ballast may make the difference between satisfaction and dissatisfaction in service. For instance, in a well-made ballast the laminations of steel that form the core on which the coil is wound, are clamped tightly and further anchored in varnish (baked on) or filling-compound or both, in order to prevent vibration of these parts and a resulting humming or buzzing noise. Again, where filling compounds are used, a properly designed ballast will not leak compound under normal extremes of operating temperature. Temperature extremes in the ballast can in large part be prevented by promptly removing lamps which have reached the end of their useful life.

Just as the corner drugstore is not to be recommended as the place to buy electrical appliances, so the local hardware store may tend to carry a cheap line of fluorescent fixtures. Such fixtures though often not cheap in selling price, may be thoroughly cheap in construction and materials used. The make-up of fluorescent fixtures is such that any tinsmith with a cornice-brake can shape a piece of metal, paint it, and mount lamp-holders and a ballast, and he has a fixture for sale. In so doing his aim is only to light the lamps, without regard to how they burn or how long they may last, nor does he care how well or in what directions the light is distributed. Such fixtures have been appearing on the market in large numbers, while reputable manufacturers frequently were finding it difficult to get materials to fabricate fixtures at all.

Fluorescent lamps usually fail or "burn out" due to deactivation of the cathodes, i.e., the coating on the cathodes is consumed and an arc cannot be maintained in the lamp. At this stage the lamp may flash on and promptly go out or, in some cases, only glow dully at one or both ends. Under either condition, current flow through the ballast is higher than for normal lamp burning and ballast heating is correspondingly increased. Unless the "dead" lamp is removed or replaced promptly, permanent damage may be done to the ballast and either compound melted out or the ballast destroyed. Where manual starting switches are used, this condition can exist only when the switch is left in the "preheating" position and, in most of these switches, this is not possible due to spring action. However, where automatic starters, in the small cylindrical metal or plastic cans, are used, such a condition will be encountered at lamp failure. Starters of the type known as "no-blink" or "cut-out" starters now are available on the market; these have an additional feature built-in that acts

Courtesy General Electric Co.

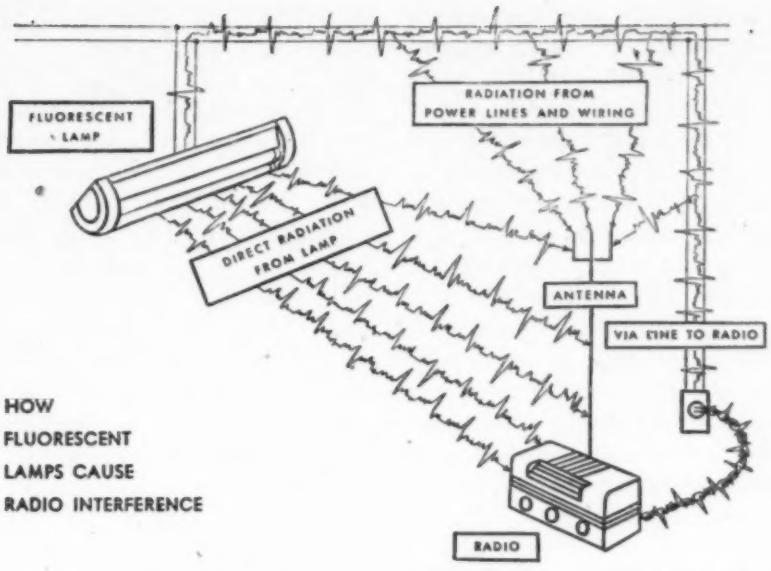
Three 20-watt fluorescent tubes in the overhead fixture provide general illumination for this kitchen, while fluorescent lamps over the sink and work areas provide high levels of illumination for seeing.

to open the circuit after a limited number of attempts at starting the lamp. These devices act to stop the flashing of the lamp, which in itself may be bothersome, and to disconnect the lamp from the circuit and thus prevent serious overheating of the ballast.

The published or guaranteed life of lamps is an average for all lamps or the life of the "average lamp." In a group of lamps it is quite probable that some will have an extremely short life while some others will have a very long life, under the same operating conditions. As life guarantees are extended, the spread in actual burning hours will probably become more apparent. A short-lived fluorescent lamp is then likely to make more of an impression on the user than a correspondingly short-lived incandescent lamp. The life of the lamp is a function of the ballast and starter with which it is used and, hence, it is important that these auxiliaries have proper characteristics.

Each size of lamp requires its own special ballast and starter, though starters are to some extent interchangeable. Each size of lamp requires its own spacing between lampholders; hence lamps of different ratings are not interchangeable. Care needs to be taken, therefore, in purchasing replacement parts that they are proper for the lamp or circuit in which they are to be used. The difference in lamp lengths means that only the proper replacement lamp can be inserted in a given fixture. With starters, this is not true; the 15/20-watt starter can be inserted in the socket of a 30- or 40-watt lamp, and vice versa. However, lamp and circuit characteristics are such that the 15/20-watt starter will function properly only in its use with lamps of those ratings, while the 30/40-watt starter will operate satisfactorily only in the 30- or 40-watt lamp circuits. The replacement of a ballast is an electrician's job and again replacement must be with the proper type of ballast if light output and lamp life are not to be affected. Starters of good quality should last through the life of several lamps without in themselves failing. The life of the ballast should be measured in years, unless it is so installed that it cannot dissipate the heat which must be generated in it; prompt replacement of failed lamps, or removal from the circuit by a "cut-out" type of starter, should assist in getting full life from the ballast equipment.

Because of the manner in which visible light is generated in the fluorescent lamp, the light output tends to follow almost instantaneously any variation in supply voltage. This means that when such lamps are used in circuits subject to varying voltage conditions, the fluctuations in light are likely to be greater than would be had from incandescent lamps. So rapid is the response of these lamps that they tend to follow even the cyclic variation of an



Courtesy Solar Mfg. Corp., New York City 17

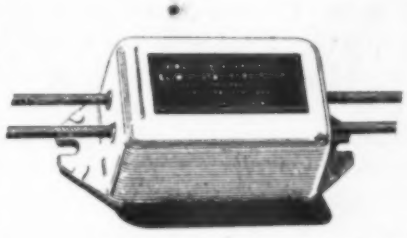
Illustration of diagram showing how fluorescent lamps cause radio interference.

alternating current supply. This characteristic causes what is known as stroboscopic action, and may cause moving objects to appear to move in a series of jumps, to move at a different speed (as with a revolving wheel or fan, for example), or to stand still. For certain operations this condition might be quite bothersome; in other instances, where moving parts (as of a machine) may appear to be standing still, it might well enough be dangerous. When two lamps are burned in such a manner that these cyclic variations are out of phase, i.e., not occurring at the same instant of time, the resulting illumination may be relatively free of stroboscopic effect. Ballasts which operate lamps in pairs to obtain this correction usually are known as two-lamp, high-power-factor ballasts. Two-lamp, low-power-factor ballasts normally do not provide this correcting influence.

Power factor is an engineering term applied to these ballast circuits to indicate the ratio between the current calculated as necessary to supply the lamp watts and that actually taken by the operating circuit. For instance, two 40-watt lamps burning from the usual supply circuit require about 0.8 ampere to furnish the 80 watts to the lamps and the small heat loss in the ballast. A high-power-factor ballast would operate to approximate this condition, but a low-power-factor ballast might require 1.5 amperes to operate the same two lamps. Where only one or two low-watt lamps are used, power factor is of little importance to the consumer, for the meter will turn at about the same rate regardless of whether the lamps operate in a high-power-factor circuit or one of low power factor. However, when lamps are used in considerable numbers, the power factor becomes important because the use of low-power-factor ballast equipment might require the use of larger transformer equipment, and larger wires to carry the incoming current. This condition, plus the lack of stroboscopic correction, makes high-power-factor two-lamp ballasts the more desirable for an installation of any magnitude.

The electrical and mechanical construction details of the two-lamp high-power-factor ballast are such that its cost is 2 to 3 times that of the corresponding low-power-factor equipment. For a large percentage of the installations of lamps rated at more than 20 watts, this additional cost is fully justified in the quality of illumination provided.

To this point, this discussion has dealt primarily with fluorescent lamps of the hot-cathode variety. However, with the exception of that discussion referring to starting and lamp failure, most of what has been said would apply equally well to lamps of either the hot-cathode or cold-cathode types.



Courtesy Solar Mfg. Corp., New York City 17

A radio interference filter for fluorescent lamps.

The cold-cathode lamp is instant-starting, i.e., it requires no starter. Certain hot-cathode lamps now are appearing on the market which likewise are instant-starting. In either case, special ballasts or transformers are required which produce a voltage high enough to start the lamp. Depending on the lamp length and other characteristics, this starting voltage may range from *450 to 1000 volts*, quite dangerous voltages, of course. Where such operating circuits are used, adequate safety means should be

incorporated to protect those who must service the lamps.

Hot-cathode lamps have a guaranteed life of from 2500 to 6500 hours depending upon the burning period per start. Cold-cathode lamps have a guaranteed life of 10,000 hours, which is said to be independent of the number of starts. Hot-cathode lamps are somewhat more efficient light sources than are cold-cathode lamps. Both types of lamps show about the same rate of deterioration (loss of efficiency) as they are burned and in each case this rate of deterioration is much greater during the first hundred hours than later in their life. The choice between these two forms of lamps, where not limited by length or physical dimensions, reduces, after all other considerations, to the relative importance of the inconvenience of lamp renewals as compared with differences in efficiency.

This is but a brief review of fluorescent lamps as we know them today, and of some of their operating problems and peculiarities. In auxiliary equipment necessary for operation and a number of factors likely to affect satisfaction in use, they are far more complicated than the incandescent lamp. They have definite advantages, however, for some purposes, and in efficiency of light production and in the possible lighting effects that may be achieved through their use, fluorescent lamps have made a distinct place for themselves among present-day light sources.

★ ★ ★ ★ ★ *Flasheat Water Heater* ★ ★ ★ ★ ★

ABOUT every so often gadgets and appliances, which have been in use and have become discredited for one reason or another, are revived. An example of such an item recently revived is the *Flasheat Electric Water Heater*, sold at $4.95 (distributed by the Union Sales Co., 141 Broadway, New York 6). The name of the manufacturer was not in evidence either on the heater or its container, and after our test data were in hand, it was clear why a manufacturer would not care to emphasize his relationship to the article. The appliance consisted of a section of resistance wire enclosed in a pressed steel case; the case was cylindrical in shape and had holes punched in it at each end so that the water could completely surround and circulate past the heater wire. The instructions on the container stated that the heater should first be completely submerged in water and then the cord plugged into any light socket. When tested it drew almost 15 amperes of current at 115 volts a-c, and the leakage current between the water being heated and ground was very great —160 to 1700 milliamperes— to be compared with a leakage current of 0.2 ma. (or 1/800 to 1/8000 as much) that is considered safe. Fifteen amperes is considered an excessive continuous load for most outlets in the home (fire hazard), and 160 ma. leakage is definitely dangerous, especially on an appliance connected with or used near water or sewerage piping as in a kitchen or bathroom, where this water heater is most likely to be used. The heater cord also became very warm in a short time, indicating that the wire in the cord was not of sufficient size to carry the 15-ampere load of the heater. Proper engineering, in a word, was conspicuous by its absence from the *Flasheat* gadget.

The operating cost of this type of heater is very high. If the consumer is paying 3 or 4 cents per kilowatt for electricity, it would cost roughly three times as much to heat water by electricity as it would if gas were used (of 550 Btu. per cu. ft. and costing about $1 per 1000 cu. ft.). In fact, it is advisable to use electricity for heating water in quantity only when special reduced, "off-peak" rates are applicable, as CR has previously pointed out.

Any electrical appliance manufacturer should be well aware of both the shock and fire hazards possible when ungrounded equipment is used in or near water or moisture in the home. Certainly there is no excuse for a manufacturer's not making use of existing and easily obtainable information concerning the design of an appliance of this kind. CR reported on tests of appliances of this sort as early as 1932 and gave detailed accounts of the nature of the hazard connected with the use of both the faucet type and the immersion type heater typified by the *Aladdin* heater of that period. The present appliance is another example of the disregard with which some manufacturers still hold the consumer, or perhaps, in some cases, of their unwillingness to employ engineers to provide them with acceptable designs before undertaking to enter a technical manufacturing business.

Two Frozen Food Utility Carriers

WITH the greatly increased use of frozen foods and the noticeable increase in consumers' use of the facilities for food refrigeration and storage during and since the war, the problem of carrying frozen foods from a storage locker or a grocer's has become one of some importance to the consumer. This article reports the results of tests made by CR on two devices, purchased from a large New York City housewares dealer, which the consumer can use for transporting frozen foods. Their manufacturer terms these "Interlined Utility Containers."

THERE is an undeniable need for a frozen food carrier for consumer use, but to attain wide use, such a container should be inexpensive. It is fairly well known that frozen foods of all kinds should be consumed as soon as possible after defrosting, and of course there is often a possibility of a food packet's becoming partially or wholly defrosted while being carried from the place of purchase or storage to the home, especially during very hot weather, or while the package is left in a closed automobile which may happen to be parked in the sun. This defrosting would not necessarily be noticeable to the housewife who hurriedly unpacks her purchases and stores them, and then wonders, two days later, when the frozen foods are removed from the freezing compartment of the refrigerator, why they have become depreciated in quality or even spoiled.

The fact that the frozen food industry has not had a single case of food poisoning directly proven against it in the past 16 years is no reason, of course, for relaxing the standards which frozen food distributors have attempted to maintain during the industry's comparatively short existence. There is evidence that purveyors of frozen foods are not being as careful as they should be in this matter for their own interest and that of the public. This is sufficiently evidenced by the open frozen food dispensers which are now found in many chain stores. This convenient arrangement, although it no doubt increases sales, certainly does not assure maintenance of the packages at the below-zero temperature which is necessary, as stressed by Mr. B. E. Proctor, director of the Samuel Cate Prescott Laboratories of Food Technology at Massachusetts Institute of Technology, in a paper presented at the annual meeting of the American Society of Refrigerating Engineers, who said that "adequate refrigeration of frozen cooked foods is imperative from the time of precooking until ready for use by the consumer." He also drew attention to the fact that when thawed and allowed to stand, many frozen precooked foods are an excellent foundation for the growth of microorganisms, including some that may be harmful. He called attention, too, to "the importance of extreme care in all the manufacturing operations, combined

Satchel Type Carrier (made by Aeronautical Supplies, Inc.)

	Temperature rise (degrees F) from an initial temperature of 0°F for frozen food packets at the end of a 6-hour period in the carriers M, N, and O.			*Temperature rise (degrees F) from an initial temperature of 0°F for frozen food packets exposed (no insulation) at room temperature for 1 hour.*
	M	N	O	
Peas	30	25	28	20
Succotash	30	32	22	24
Meat	27	29	21	26
Water (ice)	32	32	28	32

NOTE: The spoilage rate increases rapidly in foods when 32°F is reached. Room temperature was 70°F in both cases.

with immediate freezing and continued storage at below-zero temperatures." This, he said, "cannot be stressed too strongly. This continued refrigerated storage is necessary through transportation and distribution channels, as well as at the point of consumption unless the foods are used immediately. *Retail outlets should not be considered exceptions to this rule.*" (Italics ours—CR.)

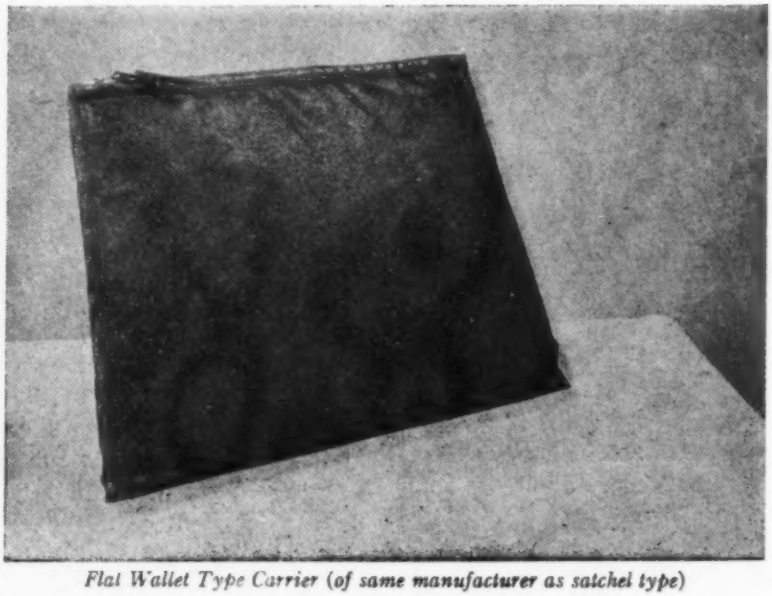
* * *

The first frozen food carrier tested (designated M) was in the form of a large flat wallet about 19 inches long at the bottom, 16 inches long at the top, and 13 inches high, closed by a slide fastener (*Talon*). It was lined with what appeared to be a rubberized cloth. The outer facing was a brown imitation leather coated fabric with a pebbled finish. The label stated that the insulating material was *Fiberglas*.

The second carrier (N) was in the form of a small satchel, 20 inches long, overall, 8 inches wide at the base, tapering to about 3 inches at the top. It was equipped with a slide fastener and provided with two strap handles. The lining, facing, and insulation were the same as used in carrier M.

For purposes of comparison, a rectangular box with double walls was constructed of corrugated cardboard. The dead-air space between the walls was filled with dry mineral wool. The storage space was 16 inches long, 7 inches wide, and 11 inches deep. The idea of constructing the box was that it would be used as a basis for comparison, to determine what might be expected from a food container which was properly designed, without the limitations that might conceivably apply to a commercial device intended for mass distribution. This homemade container will hereafter be designated as O.

To measure the rate of rise of temperature of the contents of the packages, a thermocouple was inserted into the contents of each package before it was placed in the food carrier. The rate of rise of the temperature of the food would be a useful means of judging the effectiveness of the carrier as a barrier to heat flow into the food packets and thus its usefulness in postponing defrosting. A test was also made in which similar packages of frozen food were exposed to the open air in the same room and allowed to defrost. Finally a third test was run to measure the heat transfer rate from the inside



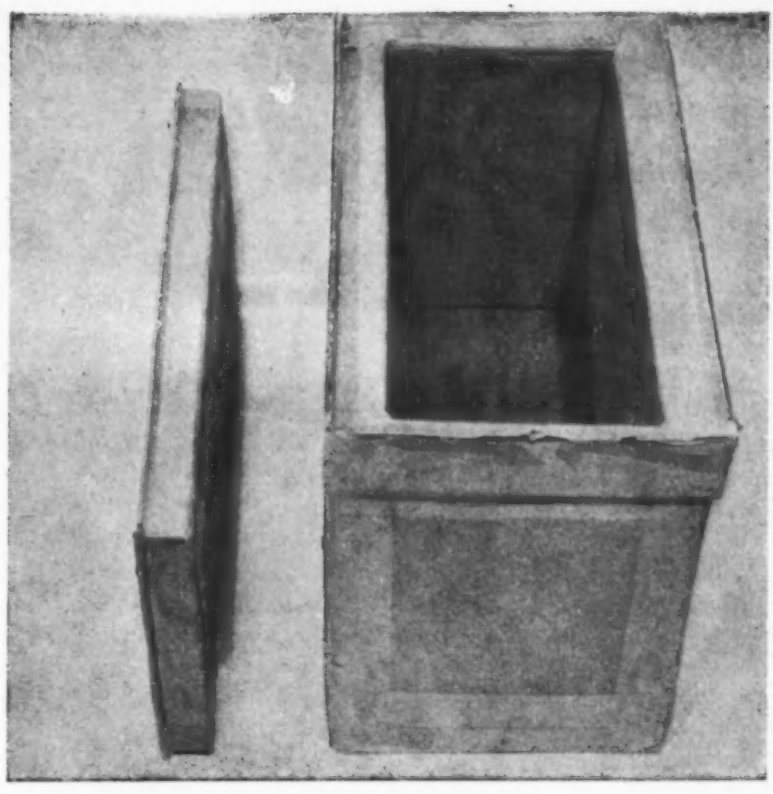
Flat Wallet Type Carrier (of same manufacturer as satchel type)

of the carriers to the outside air, and in this way give an indication of the carriers' value as a means of transporting hot foods or liquids (for instance on a picnic or an all-day automobile trip). The foods used in the tests were peas, succotash, and meat; water and ice were also included for comparison purposes.

The results of the first two tests are summarized in the accompanying chart and seem to substantiate the claims made in the advertisement that the carriers will "keep frozen foods frozen for 6 hours."

The test samples were all at 0°F initially, which is the temperature at or below which frozen foods are supposed to be kept in storage. It can readily be understood that if a commercial storage compartment is (because of frequent opening of the doors or lids, or for other reasons) not kept at this temperature, the initial temperature could easily be much higher, and consequently the carriers would be less effective in protecting the product against defrosting.

The results of the third test indicated that the carriers could be satisfactorily used to transport heated foods, although their efficiency would be less than that of the well-known vacuum bottle. It was found that, with the temperature inside the carrier maintained at about 100°F and a constant outside temperature of 54°F, each carrier showed a heat transmission of approximately 70 Btu. per hour. (A Btu. or British thermal unit is the amount of heat necessary to raise the temperature of a pound of water 1°F.) A gallon of hot water would, as a rough approximation, lose 8° to 10° of temperature for each of the first few hours the water was in the carrier in a room at ordinary temperatures.



Insulating box and lid built specially for comparison purposes in tests of commercial frozen food carriers.

No tests were made to determine the durability of construction of the containers; the listings are thus tentative in the sense that we are not yet in a position to judge that characteristic. However, seams were all double-sewn and were fairly well finished; workmanship appeared good. There was some possibility that insulating effectiveness might be somewhat reduced with time, due principally to partial compacting of the *Fiberglas* insulation. Prewar prices for similar wallets (without the insulation, which is an inexpensive material in the small quantities needed in these carriers), were in a much lower price range.

B. Intermediate

Satchel Type Carrier (Aeronautical Supplies, Inc., Reading, Pa.) $10. 20 in. long overall, 8 in. wide at base tapering to 3 in. at top. Closed with slide fastener. Two strap handles provided. Lined with rubberized cloth. Outer facing, brown imitation leather coated fabric with pebbled finish. *Fiberglas* insulation. Construction and workmanship, satisfactory.

Flat Wallet Type Carrier (Aeronautical Supplies, Inc.) $6.50. 16 in. long at the top, 19 in. long at the bottom, and 13 in. high, with slide fastener for closing. Lined with rubberized cloth. Outer facing, brown imitation leather coated fabric with pebbled finish. *Fiberglas* insulation. Construction and workmanship, satisfactory.

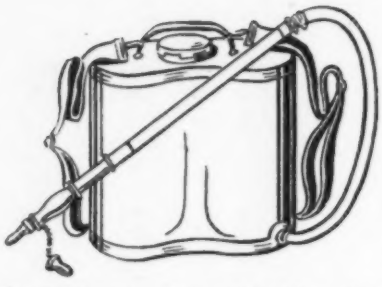
Fire Extinguishers—III

Hand-Pump Tanks

For fires in ordinary combustibles (wood, paper, textiles, rubbish, etc.), of value wherever the quenching effect of water solutions may be employed. *Not* to be used on live electrical equipment nor on fires in open containers of flammable liquids.

These are simply metal tanks arranged with a handle for carrying them to the fire and a pump by means of which a stream of water or solution of non-freezing material in water may be directed on the fire. The 5-gallon size has an extinguishing capacity approximately equal only to that of a 2½-gallon soda-acid extinguisher. This is because the action depends on pumping by the operator and because the unit must be set down and held in one place by the operator's foot while in use, which makes it less convenient for directing a stream on the fire from several directions in succession than is the case with extinguishers of the self-generated-pressure type. Range, 30 to 40 feet. There is a real advantage in that the appliance can be used intermittently, as the other extinguisher cannot. The hand-pump fire extinguisher can be refilled readily during use and is a good type for farms and country estates which have only a small supply of water available. Never permit use of an extinguisher of this type as a potato sprayer for farm or garden.

A type of hand pump extinguisher.



Knapsack type fire extinguisher (and sprayer).

Back-pack types listed are particularly suitable for outdoor fires in grass, brush, and rubbish.

The hand-pump tank extinguishers were produced in large volume for Office of Civilian Defense distribution during the war. As they are not required to withstand high pressures, there is no danger in the use of war surplus extinguishers of this type.

The following pump tank extinguishers, listed by manufacturer's name, are recommended.

A. Recommended

American-LaFrance-Foamite Corp., Elmira, N. Y. ● *Commander* and *Rescue*: 2½- and 5-gal. sizes.

Buffalo Fire Appliance Corp., 44 Central Ave., Buffalo ● *Buffalo*: 2½- and 5-gal. sizes.

Geo. W. Diener Manufacturing Co., 400 N. Monticello Ave., Chicago 24 ● *Diener*: 2½- and 5-gal. sizes.

The Fyr-Fyter Co., 221 Crane Ave., Dayton, Ohio ● *Fyr-Fyter*: 2½- and 5-gal. sizes.

General Detroit Corp., 2272 E. Jefferson Ave., Detroit 7 ● *Alaskan*: 2½- and 5-gal. sizes.

Harker Manufacturing Co., Cincinnati ● 5-gal. size.

Miller-Peerless Manufacturing Co., 452 N. Sangamon St., Chicago 22 ● *Miller*: 2½- and 5-gal. sizes.

Parco Products Co., Allentown, Pa. ● 5-gal. back-pack extinguisher.

Pyrene Manufacturing Co., 560 Belmont Ave., Newark 8, N. J. ● *Pyrene* (formerly *Duragarde*): 2½- and 5-gal. sizes; *Accurate*: 5-gal. sizes.

Pyrene Manufacturing Co. of Canada, Ltd., 91 Don Roadway, Toronto, Ontario ● *Accurate*: 5-gal. size.

D. B. Smith & Co., Inc., Main St., Utica, N. Y. ● *Arrow*: 5-gal. size; *Indian*: back-pack model 90g, 5-gal. size.

Randolph Laboratories, Inc., 8 E. Kinzie St., Chicago ● *Randolph*: 5-gal. size.

Stempel Fire Extinguisher Manufacturing Co., Jasper & York Sts., Philadelphia ● 2½- and 5-gal. sizes.

Powder Tubes

Small quantities of inert matter, or mixtures of bicarbonate of soda, coloring matter, and other materials, in powder form, cased in sheet metal tubes and other containers, have been sold as "fire extinguishers" at various times and under a wide variety of names. Their contents are supposed to be thrown at the fire, from the end of the tube. (A small amount of carbon dioxide gas produced from the sodium bicarbonate by the heat of the fire adds slightly to the small extinguishing ef-

fect.) The commonest type uses about 15c or 20c worth of commonplace materials in a unit which is sold at a price of $3.50 to $5. These "extinguishers," of whatever name or brand, are of such extremely limited value that their use is definitely *not recommended.* If a specially treated bicarbonate of soda is not used, the powder may cake after a short period, and it is very common to find such appliances totally inoperative. Like grenade and bottle extinguishers, they are dangerous because they engender a false sense of security.

Soda-Acid Type

For fires in ordinary combustibles (wood, paper, textiles, rubbish, etc.), of value wherever the quenching effect of the water solution may be employed, including greasy or oil-soaked floors, etc. Soda-acid

The familiar soda-acid extinguisher.

extinguishers are NOT to be used on live electrical equipment; they are not effective on fires in open containers of flammable liquids or greases, etc.

Of this commonest, and, for its capacity, least expensive, type of extinguisher, the principal size is 2½ gal. As a basis for shopping, the price paid by the government at wholesale for 2½ gal. soda-acid extinguishers is $11, on rigid quality specifications. 1¼- and 1½-gal. sizes are made, and are advantageous for use by women or children. Inversion of the extinguisher mixes sulphuric acid and a water solution of sodium bicarbonate, generating pressure to expel the liquid with force, without further action by the operator. The quenching effect is due to the water and not to the carbon dioxide gas. The solution must in general be considered harmful to fabrics on which it may fall. This type of extinguisher is not suitable for unheated rooms or buildings; the freezing point cannot be lowered by chemical additions. Recharging is required at least once a year. This is inexpensively done; arrangements can often be made to have the work carried out by one's fire department.

The following soda-acid extinguishers, listed by manufacturer's name, are recommended.

A. Recommended

W. D. Allen Mfg. Co., 566 W. Lake St., Chicago 6 ● *First Aid*: 2½-gal. size.

American-LaFrance-Foamite Corp., Elmira, N.Y. ● *Alert, Childs, Empire, Sodex*: 2½-gal. size.

Badger Fire Extinguisher Co., 626 Somerville Ave., Somerville, Mass. ● *Badger's Pony*: 1¼-gal. size; *Badger's*: 2½-gal. size.

Buffalo Fire Appliance Corp., 44 Central Ave., Buffalo ● *Junior Buffalo*: 1¼-gal. size; *Buffalo*: 2½-gal. size.

Canadian Fire Hose Co., Ltd., Montreal, Quebec ● 2½-gal. size.

Columbia Fire Extinguisher Co., Inc., N.Y.C. ● 2½-gal. size.

Coulter Copper & Brass Co., Ltd., Toronto, Ontario ● 2½-gal. size.

Geo. W. Diener Mfg. Co., 400 N. Monticello Ave., Chicago 24 ● *Diener*: 1½-gal. size; *Automatic*: 2½-gal. size.

Elkhart Brass Mfg. Co., 1302 W. Beardsley Ave., Elkhart, Ind. ● *Elkhart*: 2½-gal. size.

The Fyr-Fyter Co., 221 Crane Ave., Dayton, Ohio ● *Dayton* and *Fyr-Fyter*: 2½-gal. size.

Garth Co., 750 Belair Ave., Montreal, Quebec ● *Garth*: 2½-gal. size.

General Detroit Corp., 2200 E. Jefferson Ave., Detroit ● *Red Star* and *Hi-Test*: 2½-gal. size.

Globe Automatic Sprinkler Co., 2035 Washington Ave., Philadelphia ● *Globe*: 2½-gal. size.

Harker Mfg. Co., 121 W. Third St., Cincinnati ● *Queen*: 2½-gal. size.

Walter Kidde & Co., Inc., 675 Main St., Belleville, N.J. ● *Kidde*: 2½-gal. size.

Knight & Thomas, Inc., 624 Somerville Ave., Somerville, Mass. ● *Underwriters*: 1¼-gal. size; *Protex, Security, Vulcan, Underwriters*: 2½-gal. size.

LaFrance Fire Engine and Foamite, Ltd., Toronto, Ontario ● *LaFrance* and *Alert*: 2½-gal. size.

Miller-Peerless Mfg. Co., 452 N. Sangamon St., Chicago ● *Standard*: 2½-gal. size.

Phister Mfg. Co., 621 E. Pearl St., Cincinnati ● *Phister*: 2½-gal. size.

Pyrene Mfg. Co., 560 Belmont Ave., Newark, N.J. ● *Pyrene* (formerly *Essanay, Guardene, Vangarde*): 2½-gal size.

Pyrene Mfg. Co. of Canada, Ltd., 91 Don Roadway, Toronto, Ontario ● *Pyrene* (formerly *Guardene*): 2½-gal. size.

Randolph Laboratories, Inc., 8 E. Kinzie St., Chicago ● *Randolph*: 2½-gal. size.

Rockwood Sprinkler Co., 38 Harlow St., Worcester, Mass. ● *Rockwood*: 2½-gal. size.

A. C. Rowe & Son, Inc., N. Y. C. ● 1¼-gal. and 2½-gal. sizes.

The Standard Extinguisher Co., 195 High St., Boston ● *National Standard*: 2½-gal. size.

Stempel Fire Extinguisher Mfg. Co., Jasper & York Sts., Philadelphia ● *Aaron, Acme, Kontrol, Stemfire*: 1½-gal. and 2½-gal. sizes.

Vaporizing Liquid Extinguishers (Carbon Tetrachloride Base)

The modified carbon tetrachloride used in these extinguishers is safe against freezing (down to temperatures of —50°F) and practically harm-

less to most materials, but involves danger to the user in confined spaces or small unventilated rooms. The vapor produced is a powerful anesthetic and poison, similar to chloroform. There is the possibility of the forming of even more poisonous gases (chlorine, hydrochloric acid, and phosgene) when the extinguisher is used on fires developing high temperatures. For this reason the Journal of the American Medical Association has said of carbon tetrachloride: "Its use in fire extinguishers, inside of buildings, constitutes a dubious practice." Experienced fire protection engineers say, however, that except in unusual cases there has seemed to be little practical danger from the use of the SMALLER sizes of

Stored pressure (continuous stream) type of carbon tetrachloride fire extinguisher.

the tetrachloride extinguishers, *in the open* or in *large* rooms.

Ordinary or commercial carbon tetrachloride must not be used in fire extinguishers, as it may freeze at low temperatures (its freezing point is about 9° below zero Fahrenheit); also it corrodes the mechanism of the extinguisher, which is a difficulty the extinguisher manufacturers have had to a serious extent, even with extinguisher liquids made under their own specifications for their own purposes[1]. Ultimate consumers should invariably purchase the liquid offered by the manufacturer of the extinguisher in which it is to be used, so that they may be in a position to hold the manufacturer of the extinguisher responsible should the appliance corrode or otherwise fail in an emergency. A carbon tetrachloride extinguisher can and should be tested by discharging the liquid periodically into a clean receptacle (outdoors), from which it can be poured back into the extinguisher. This type is difficult to maintain, as the liquid is an effective dry cleaner and has often been stolen for spot-removal uses. *Frequent inspection is essential.* Location of the extinguishers away from high temperature heating equipment will minimize corrosion of the unit and loss of the carbon tetrachloride by evaporation.

Common type quart size carbon tetrachloride fire extinguisher, which must be pumped while being aimed at fire.

Common sizes: 1, 1¼, 1½ qt. (pump types). Extinguishing capacity of these small units is less than that of the 2½-gal. units of other types, but two 1-qt. units in skilled hands are approximately equal to one 2½-gal. foam unit on an open pan of flammable liquid. Because of their low extinguishing capacity and maintenance difficulties, none of these extinguishers is rated higher than *B. Intermediate.* Homes and institutions should not employ 1-, 2-, and 3-gal. carbon tetrachloride units, which are recommended only for industrial applications.

Extinguishers of the 1-qt. size are the most practical with which to equip an automobile or small motor boat.

The most effective makes of this type project the extinguishing liquid on the fire in a relatively fine, thin stream, so that the liquid is almost completely vaporized, thus getting the benefit of practically all the smothering effect of the gas. The stream, whether pumped by hand or furnished by stored pressure from compressed air or other gas, may be quite accurately directed at the fire, as well.

The following vaporizing liquid extinguishers, listed by manufacturer's name, are *B. Intermediate.*

B. Intermediate

American-LaFrance-Foamite Corp., Elmira, N.Y. ● *Fire Gun*: 1-, 1¼-, 1½-qt. pump type; *LaFrance*: 1-qt. pump type; *Valex*: 1½-gal., air-pressure type.

Badger Fire Extinguisher Co., 626 Somerville Ave., Somerville, Mass. ● *Badger's*: 1-, 1½-qt. pump type.

Buffalo Fire Appliance Corp., 44 Central Ave., Buffalo ● *Buffalo Super*: 1-, 1½-qt. pump type.

Dayton Fire Extinguisher Co., 1300 E. First St., Dayton, Ohio ● *Dayton*: 1-, 1½-qt. pump type.

The Fyr-Fyter Co., 221 Crane Ave.,

[1]Such specifications when used by large consumers of extinguishers permit the tetrachloride (with a freezing point depressant) to be purchased at a price approximately 50% below the customary price for the manufacturers' proprietary liquids.

Dayton, Ohio ● *Super Fyr-Fyter*, Model A: 1-, 1½-qt. pump type; *Super Model Fyr-Fyter*: 1-, 1½-qt. pump type; *Captain*: 1-gal. pump type.

Fyr-Fyter Co. of Canada, Ltd., Hamilton, Ontario ● 1-, 1½-qt. pump type.

General Detroit Corp., 2272 Jefferson Ave., Detroit ● *S.O.S. Fire Guard*, Model 85: 1-, 1½-qt. pump type.

General Pacific Corp., 1800 S. Hooper Ave., Los Angeles ● *S.O.S. Fire Guard*, Model 85: 1-, 1½-qt. pump type.

Kent Extinguisher Co., 209 Front Ave., N.W., Grand Rapids, Mich. ● *Pistol Grip*: 1-, 1½-qt. pump type.

Walter Kidde & Co., Inc., 675 Main St., Belleville, N.J. ● *Kidde*: 1-, 1½-qt. pump type.

LaFrance Fire Engine & Foamite, Ltd., Toronto, Ontario ● *LaFrance*: 1-, 1½-qt. pump type.

Phister Mfg. Co., 621 E. Pearl St., Cincinnati ● *Phister*: 1-, 1½-qt. pump type; *Phister*: ½ gal. without pump.

Pyrene Mfg. Co., 560 Belmont Ave., Newark, N.J. ● *Pyrene, Vangarde*: 1-, 1½-qt. pump type; *Pyrene*: 2 qt. and 1 gal. (with and without pump) air-pressure type.

Pyrene Mfg. Co. of Canada, Ltd., 91 Don Roadway, Toronto, Ontario ● *Pyrene*: 1-, 1½-qt. pump type.

Randolph Laboratories, Inc., 8 E. Kinzie St., Chicago ● *Randolph*: 1-, 1½-qt. pump type.

Safety Fire Extinguisher Mfg. Co., 293 Seventh Ave., N.Y.C. ● *Safegun*: 1-qt. pump type.

Stempel Fire Extinguisher Mfg. Co., Jasper & York Sts., Philadelphia ● *Stempel*: 1-, 1½-qt. pump type.

Union Stop-Fire Corp., 30 Fourth Ave., Brooklyn, N.Y. ● *Empyre, Stop-Fire*: 1-qt. pump type.

Wil-X-Mfg. Corp., 29 Ryerson St., Brooklyn, N.Y. ● *Wilbur*: 1-, 2-qt. pump type.

At least two makes of fire extinguishers are made to be similar in appearance to standard 1-qt. vaporizing liquid (carbon tetrachloride base) extinquishers, but are equipped with an inferior pump of the bicycle tire type which, in addition to other defects, fails to pump the liquid when the conditions of use require the stream to be directed above the horizontal. Local insurance agents (usually acting through ignorance of the technical problems involved) are often sold these inferior types for free distribution to their clients, as they are offered at much lower prices than standard makes.

Water-Filled Carbon Dioxide Cartridge Extinguishers

These are similar in appearance, size, and general effectiveness to the soda-acid type. No harmful chemicals are used. Instead, pressure to expel the

Water-filled carbon dioxide cartridge extinguisher.

extinguishing liquid (plain water) is provided by a small cartridge of carbon dioxide, a sealing disk of which is punctured when the extinguisher is inverted and bumped on the ground. These are NOT recommended for fires in live electrical equipment, and are NOT suitable for use in unheated buildings. (Non-freezing extinguishers using the same principle are available, however.)

The following extinguishers, listed by manufacturer's name, are recommended.

A. Recommended

Walter Kidde & Company, Inc., 675 Main St., Belleville, N.J. ● *Kidde*: 2½-gal. size.

Pyrene Mfg. Co., 560 Belmont Ave., Newark, N.J. ● *Pyrene* (formerly *Hydrogarde*): 2½-gal. size.

Water Pails and Cask and Pails Units

Five substantial 12-qt. capacity pails of fiber, galvanized

A typical fire pail.

iron, or steel, preferably with loosely fitted cover, are approximately as effective as one 2½-gal. soda-acid extinguisher, but have much more limited range. A 50-gal. covered cask or barrel of water and three pails make a recommended unit. Suitable pails are obtainable from most good hardware stores or from the following makers:

Geo. W. Diener Mfg. Co., Chicago. 12-qt. capacity, with "*Waggoner*" stenciled on bucket.

A. C. Rowe & Son, Inc., N.Y.C. Only pails in tanks, capacities 25 gal. with six 10-qt. pails, etc. Marking, "*American.*"

Safety Fire Extinguisher Co., N.Y.C. Only pails in tanks, capacities 25 gal. with six 10-qt. pails, etc. Marking, "*Safety.*"

References on Fires and Use of First-Aid Fire Appliances

Except as otherwise designated, single copies of the following references are available free of charge from the sources mentioned. The Coast Guard Regulations are available for reference by the public in the various Coast Guard Headquarters throughout the United States.

Approved Equipment—Fire Protection Devices and Devices Involving Fire Hazard, Bulletin No. 90.00. 35 pages. April 1946. Associated Factory Mutual Fire Insurance Companies, 184 High St., Boston.

Extinguisher Performance. April 1946 Quarterly of the National Fire Protection Association, Boston. Statistical record of the use of fire extinguishers in various cities of the United States.

Fire Extinguishers—Bulletin No. 77. 52 pages, illus. 1937. Associated Factory Mutual Fire Insurance Companies, 184 High St., Boston. Description, advantages, limitations of all types of extinguishers, extinguishing agents.

Fire Protection Regulations for Motor Craft — Pleasure and Commercial. 31 pages. 1941. National Fire Protection Association pamphlet (Boston, Mass.), prepared and revised by Marine Section, N.F.P.A. Contains regulations for installation and maintenance of fire extinguishing equipment.

Fire Safeguards for the Farm—Farmers' Bul. 1643. U.S. Dept. of Agric., Washington, D.C., 1938. 5c, from Supt. of Docs., Washington, D.C. 24 pages, illus. Excellent brief statements of fire hazards, roof covering materials, chimney construction, stoves and furnaces, lamps, gasoline, storage of hay and other important items.

First Aid Fire Appliances—Standards of the National Board of Fire Underwriters for the Installation, Maintenance and Use of, as Recommended by The National Fire Protection Association, N.B.F.U. Pamphlet No. 10. 77 pages, illus. August, 1938. Contains description of principles and practices in extinguishing small fires, and advice regarding the suitability, use, and maintenance of the various devices, including water pails.

General Rules and Regulations for Vessel Inspection, Ocean and Coastwise — U.S. Coast Guard. 107 pages. Aug. 1943. U.S. Coast Guard, Washington, D.C. (See note in col. 1 regarding availability.)

Instruments, Machines, and Equipments Approved for Use on Merchant Vessels. 105 pages. May 1943. U.S. Coast Guard, Washington, D.C. Contains list of fire extinguishers approved for use on merchant craft. (See note, col. 1.)

List of Inspected Fire Protection Equipment and Materials. 183 pages. Jan. 1946. Underwriters' Laboratories, 207 E. Ohio St., Chicago.

Motor Craft (Fire Record). 12 pages, illus. 10c, from National Fire Protection Association, 60 Batterymarch St., Boston. Contains information regarding causes of motor craft fires.

Safe Use and Storage of Gasoline and Kerosene on the Farm—Farmers' Bul. 1678. 14 pages, illus. 1945. U.S. Dept. of Agric., Washington, D.C. 5c, from Supt. of Docs. Prepared jointly by U.S. Dept. of Agric. and National Fire Protection Assn. This bulletin contains illustrated instructions and suggestions regarding extinguishers for gasoline and kerosene fires.

The Story of the National Fire Protection Association and List of its Publications. 12 pages. 1945. Boston: (60 Batterymarch St.) Contains names of authoritative publications on a wide variety of subjects related to fire prevention and fire protection.

Too Often—The Goods Are Not There Even When the Advertising Announces "Immediate Delivery"

THE consumer who reads advertising of appliances and assumes they are available is often disappointed when he comes to the point of actually making a purchase, as we have pointed out in two brief previous articles. *Unless he actually tries to buy the item and obtain prompt delivery*, he is likely not to learn that the advertised item is not available; in a surprising number of cases large department stores have advertised freezers, washing machines, dishwashers, and similar items as "for immediate delivery," but when one tried to buy, he was invited to *place his order on file* for delivery in six weeks—or six months—as the case might be.

Advertisers have done themselves a poor service by this technique, because many people assume that an immediate delivery means exactly what it used to mean, and are not convinced by any excuses, such as that all the available stock was exhausted before the prospective purchaser arrived to buy the appliance. CR has received many letters from people asking about our findings on a certain appliance, such as a washer or freezer, when the appliance was actually not available in the market at all; yet readers supposed that because they had seen department store advertisements or catalog listings, the items were available for purchase whenever wanted.

There are ways of indicating in advertising that the supply is limited or that only the first six (or 20, or 100) customers can be taken care of, and if the big advertisers do not start utilizing those methods of expressing the facts, they will find that a lot of ill will is being accumulated that will be quite disadvantageous to the firms' interests, when the appliance trades have again returned to a normal basis of production and delivery.

Prestone Motor Oil

Prestone Motor Oil is not a petroleum product, but a synthetically produced oil containing no petroleum. It has a high viscosity index, which is a desirable feature, as it is a major factor which tends to favor relatively easy starting of the car in cold weather and maintenance of a good oil film in hot-weather driving. Actual wear data from road test vehicles operated under both low and high speed conditions for periods up to two and one-half years have shown wear values comparable with those obtained with the better grades of petroleum oils. (There was no indication of any significant improvement in performance in this respect as compared with petroleum oils.) Regular and special stability and corrosion tests have proved that the oil remains clean for a longer period of time than with petroleum oils. Clean engines remained substantially free from sludge and varnish under operating conditions that normally promote formation of these oxidation products. In cars operated exclusively on the synthetic oil, there was less than the normal amount of carbon deposit. The oil was found not to affect gaskets and fiber timing gears in any adverse way.

An unusual characteristic of *Prestone Oil* was its ability to hold in solution a considerable portion of water—approximately 3%. When not driving, the water will form a lower layer if the temperature is above 50°F or float on the oil if the temperature is below this figure. This characteristic is considered an advantage if the amount of water present does not exceed 3%, as it may prevent a serious lubrication problem due to restriction of oil flow which can occur when water accumulates in a crankcase containing petroleum oil. While the synthetic oil may form an emulsion with water as other oils do, the so-called "mayonnaise" type of sludge is not formed. However, it may be noted that when a percentage of water is present in the synthetic oil, the oil does not provide the same protection against corrosion of iron due to dampness as does used petroleum oil. In general this lack of rust protection is not considered serious, as appears to be borne out by more than 2,000,000 miles of test vehicle operation. Nevertheless, it is understood that work is in progress to develop suitable additives for incorporation in the product so as to provide improved rust-preventive characteristics.

There is one essential difference between the *Prestone* synthetic oil and the usual petroleum oil: with the synthetic lubricant the oxidation products are volatile for the most part, which means that the oil remains essentially unchanged with use. Oxidation products formed from petroleum oils are non-volatile, and eventually become converted into gums, sludges, and varnish, which are insoluble in oil and hence tend to be deposited and interfere with the proper flow of lubricant or do other damage. There is, however, no reason to believe that the synthetic lubricant can be used longer than petroleum oils when contaminants such as dirt, metal particles, etc., are present.

It has been found that a single grade of *Prestone Oil*, which was originally expected to have a sufficiently high viscosity index to be used both summer and winter, has not proven satisfactory. Two grades therefore are now being offered, which are designated as the 200 and 300 oils. The 200 oil is presumed to cover the range of the SAE 10 and 20 oils of petroleum type, while the 300 grade covers the SAE 20 and 30 oils and higher.

While *Prestone Oil* has proved well suited to its job in numerous cases, the car owner planning to use it is advised by CR that he must not expect to deal with it in the same manner as he would with an ordinary oil; namely, with little attention to the problem of lubrication other than the customary occasional addition of new oil or a periodic oil change. For the present it would appear that the new *Prestone Motor Oil* will be most safely used by fleet operators and others who are accustomed to keep a close check on engine condition, oil consumption, etc. Several reasons, two of which are important to most car owners, justify this conclusion:

(1) At low temperatures *Prestone Oil* is understood to be relatively insoluble in ordinary petroleum oils, although the two will "mix" readily at engine operating temperatures. For this rea-

Editor's Note:

In the latter part of 1945, a new synthetic motor oil called *Prestone* was offered for sale by the National Carbon Company (manufacturers of *Prestone* antifreeze) in limited areas. Because of certain difficulties, it was later reported to have been withdrawn from the market; an article on the subject which CR had prepared was accordingly withheld from publication pending further information and developments. It now appears that the *Prestone Oil* is presently on sale in certain limited territories. It is understood that the information which follows is of a tentative nature and that final and assured conclusions cannot yet be reached because of the newness of the product and the lack of sufficient experience with its use to permit positive conclusions to be drawn.

son the *Prestone Oil* should *never* be added to a crankcase almost full of petroleum oil, nor should it be used as a refill unless practically all of the sludge as well as oil is removed from the crankcase. The engine and oil should be at virtual summer operating temperature before the old oil is drained out; the high temperature favors the softening and dissolving of the sludge in the oil so that it will tend to flow out of the crankcase more completely than if the engine and the oil were cooler. When *Prestone Oil* is used, the owners of cars which do not have by-passes around the oil pump screens should watch the oil pressure for any decrease which will occur if the screen becomes partially clogged. Once the screen is fully clogged, no oil can reach the engine cylinder walls and bearings. The engine will be severely damaged if the car is driven without oil pressure. (The driver should regularly observe the indications of the oil-pressure gauge.) If the gauge registers abnormally low pressure or no pressure at all, the driver should stop immediately, or drive very slowly to the nearest service station; there the crankcase pan and oil screen should be removed and cleaned. Even though no drop in oil pressure is noted, it is advisable that the screen be checked to see that it is in clean condition after about 200 miles of driving with *Prestone Oil*.

(2) Numerous complaints relative to higher oil consumption with *Prestone Oil* have been the result of the fact that this oil will remove deposits of sludge from piston-ring grooves, thus opening up spaces for the escape of oil into the combustion space which did not exist before the new lubricant was used. Thus the gradual cleansing of the engine works to the disadvantage of the owner in causing an increase of oil consumption over that which existed with the use of ordinary petroleum oil (and *Prestone Oil* is an expensive product). This applies particularly to older cars, which will often have badly worn piston rings and cylinder walls. Even though the leakage past the rings may be excessive, this will not evidence itself in the ordinary way, since the exhaust smoke, which is usually a sign of excessive oil consumption, will not appear with the new synthetic lubricant. In view of the condition described, it seems best that *Prestone Oil* be used only in cars whose rings are known to be in good condition.

We believe that insufficient data have as yet been accumulated by use over a wide area and under sufficiently extended operating conditions in old and new vehicles, to judge at this time whether or not the increased cost (*Prestone Oil* sells at 75c per quart, which is over twice as much as is paid for petroleum oils of good quality) will be offset by the benefits to be derived from its use. The oil appears to offer some advantages, especially to "fleet operators," but it does not appear to call for any special interest on the part of the ultimate consumer at this time. It will be time enough to consider its use in ordinary passenger car engines after there has been a considerably longer period of trial and experience with it and full reports of its performance, difficulties in its use, etc., have been reported in technical journals of the automobile industry.

★ ★ Corrections and Emendations to Consumers' Research Bulletin ★ ★

Radios
Page 23, Col. 2, last sentence in discussion immediately above listings.
November '46

Sentence should read: All sets had self-contained loop antennas. (The *Silvertone* set that was referred to in the concluding part of the sentence [the part which is hereby deleted] was not included in the November Bulletin, but in the December 1946 Bulletin, page 17; the listings of some of the sets that had been tested for the November Bulletin had to be carried over to a later Bulletin because of space limitations.) The *Sears Commentator* (7025) set listed *B. Intermediate* in the November Bulletin, had a self-contained loop antenna. (The name *Commentator* does not appear on the set, but has been used in advertising.) The other Sears (6002) at $11.20, listed in the December 1946 Bulletin, page 17, had a "hank" antenna of wire, normally wrapped on the back of the set to form a type of loop.

New Tire and Tube
Page 12
February '47

Through an error, the illustration of the inner tube was described as the *Lifeguard* inner tube. The line under the picture should have read: *Air Guard* inner tube.

Washing Machines
Page 18
March '47

The price of the *Thor Automagic*, Model 200C, should have been given as $169.50, plus $59.95 for dishwasher, instead of $169.50, plus $95 for dishwasher.

Sunlamps
Page 29, Col. 2
March '47

The reference to the sun's radiation as a "continuous spectrum" is not, strictly speaking, correct, for there have been subtracted from the sun's spectrum part of the radiation at certain spectral lines, through absorption by the sun's gaseous envelope. The sun radiates light in all wave lengths (between wide limits), but its atmosphere absorbs radiations passing through it, at those colors which the vapors themselves emit. The actual spectrum of the sun has certain of the properties of the continuous spectrum from which it is derived, and the lines which appear by absorption actually represent the loss of only a fraction of the total radiation.

Wear of Phonograph Records

ABOUT 300 million phonograph records were sold to Americans in 1946, and it is said that sales would have reached 400 or 500 million, if the industry had had the facilities for making that number. About 60 million of these records, it is estimated, were classical recordings or recordings which their owners would care to hear again and again over a period of time.

A collection of these records can represent a considerable financial outlay, since 12-inch shellac records cost $1 (plus 5 cents Federal tax), and 12-inch plastic records cost $2 (plus 10 cents tax). This expense, and the desire of the listener to enjoy hearing the records played a great many times before marked deterioration of tone quality occurs, make record wear an important consideration to record enthusiasts.

When a record is worn, the grooves are altered or damaged, and the result is a scratchy noise, unpleasant and irritating because of its high content of high frequency and complex sound elements. The loud sections of a record wear out first, because it is in these passages that the material of the groove has to do the most work in driving the needle to and fro. As most people have learned, the noise of needle scratch can be reduced by cutting off the "highs" through the use of the tone control, but to do this involves serious impairment of the quality of the music. Eventually of course the wear becomes so bad that the record is practically unplayable.

There are a great many factors that influence the speed with which record wear occurs. One of these is the needle used. Consumers' Research has made tests of phonograph needles and has commented on the record wear caused by various brands and types of widely sold phonograph needles. It was found that the steel and chromium needles gave the least wear on records, but produced the most surface noise. Jewel-point needles, sapphire, and ruby, cause a large amount of record wear. Sapphire and diamond needles also gave the best musical reproduction with a minimum of surface noise when they and the records were not worn. (Corresponding tests have not yet been made on ruby needles, but there is no reason to expect their performance to differ greatly from that of other jewels of similar hardness.) The "precious metal" alloy needles, themselves intermediate in wear resistance between the steel needles and the jewel needles, were more severe in their wear on records than the chromium or steel needles, and they all produced some surface noise.

The material used in making the record is evidently an important factor in determining record life. The exact composition of any specific phonograph record dough is a closely guarded trade secret, but it is known that a relatively silent surface is assured when sufficient shellac, which is an important and decidedly expensive component of the record material, is used.

Types of Records

Shellac records are of two types. Columbia and some other companies use a laminated surface—the center for strength and the outside layers of a material deemed suitable for carrying the sound track. Victor, Decca, and many other companies make a disk that is unlaminated and made up of a more or less homogeneous mixture.

There are some disadvantages in the laminated construction, since if the surfaces are punctured or cracked, as might happen if the bond between laminations is not as good as it should be, the record surface quickly disintegrates. This does not seem to be as important to the average user as the fact that wear may be very much slower in starting than wear on the other type of record. If the manufacturer is enabled to use more of the valuable shellac in the playing surface by saving it in the remaining parts of the record, the laminated construction would certainly appear to be a step in advance and should make both for longer playing life with acceptable fidelity and freedom from noisy reproduction.

It has been rumored that one of the larger record companies in this country economized on shellac when it was scarce and high priced by using plastic in its dough. Whether that is true or not, plastic records are now being made in both 10-inch and 12-inch sizes, and although the use of plastic was once considered an economy measure, these records sell for a premium price—about double that of shellac records of the same size.

Wear of Plastic vs. Shellac Records

Consumers' Research some time ago questioned whether or not the plastic disks might possess the shortcomings of plastic "transcriptions," which wear out more quickly than shellac records made for ultimate consumers' use, unless played with a light, compliant pickup. In an effort to obtain some information on this point, CR made tests on three different records —*Victor* shellac, *Victor* plastic, and *Columbia*—of the same selection, Till Eulenspiegel. No *Decca* recording of the selection was avai'able. All three records were played on an ordinary home-type automatic record player; the particular player used happened to be a *Mantola*. The pickup was adjusted by mechanical means (upward spring tension) to give the desired needle pressure. The needles used were *Admiral Lifetime Precious Jewel*, a needle which in a previous test had been found to have unusually good life for a sapphire needle. In order to avoid any question of whether records were played by needles which had had different amounts of wear, no record was played more than 100 times with any one needle. Reversal of order of records played was also carried out in order to avoid the occurrence that one record might have been played with a needle farther on toward deterioration than others. Each record was played a total of 300 times.

The *Victor* plastic, while it showed on first playing unusual clarity and barely audible surfaces, was the first to show wear and was judged to be "worn out" earliest, when judged either by appearance or pleasure in listening. As early as 50 plays there was an annoying "crackling" or "frying" background noise when the record was played.

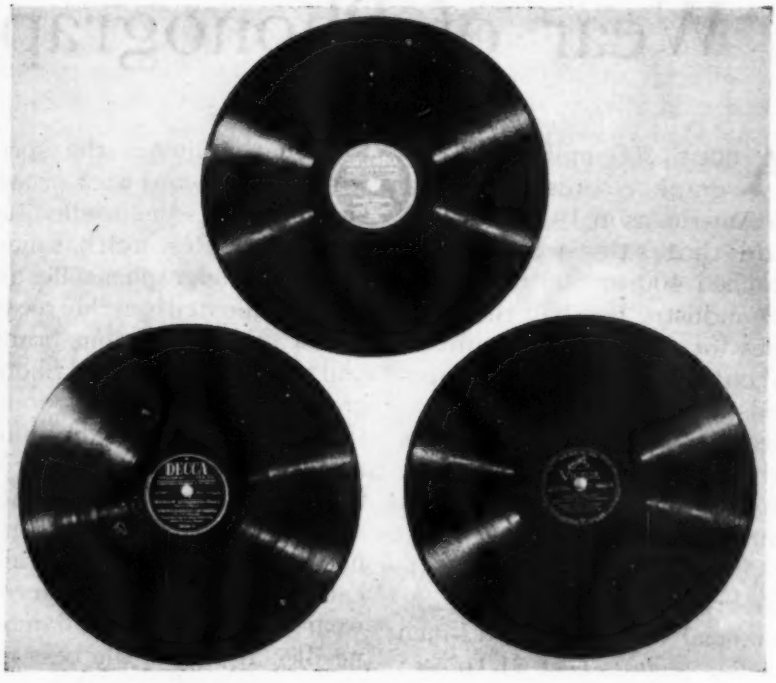


Figure 1—*Columbia*, *Decca*, and *Victor* records of Warsaw Concerto, after 325 plays.

As the wear of the record increased, the crackling noise increased. This effect was undoubtedly due to the character of the dust produced in the playing of the plastic disks, and technical magazines have recognized the special need for keeping these records carefully cleaned if low-noise reproduction is to be obtained. It has even been suggested that it ould be a good idea to rinse records of this type with cold water before playing.

The *Victor* shellac record was the second to show wear. At 155 plays, however, the plastic record was judged badly worn, while the shellac record held out about 45 plays (25%) longer before it was considered to have reached the same badly-worn condition.

The *Columbia* shellac record proved to be unusually long wearing in this test. Even at the conclusion of 300 plays this record did not show the over-all grayness (which is a definite measure of deterioration of surface) that was seen on the other two.

Wear of Shellac Records

In another surface wear test, three recordings of the Warsaw Concerto were used, one *Decca*, one *Victor*, and one *Columbia*. All three were shellac records. The *Decca* record was the first to show wear, the *Victor* the second, and the *Columbia* the last. The *Decca* began to show wear after relatively few playings (25), and appeared to be greatly worn at about 60. The *Victor* showed wear first at about 35 playings, the *Columbia* at about 60. All three records were played until each had received 325 plays, and photographs were then taken to record the difference in the appearance of the records. The differences do not show too well in the half tone on the paper

which must now necessarily be used for our BULLETIN.[1]

Pickups and Record Wear

Still another factor in record wear is the pickup used. It has long been recognized that a heavy pickup hastens record destruction; on the other hand, designers of record players know that they must avoid having a needle pressure which is too light or there will be trouble with groove skipping and with failure of the changer mechanism to function. Some consider that a reasonable compromise under present conditions will call for a needle pressure of about one ounce. A pickup also tends to cause damage to the grooves of records by its needle assembly's lateral stiffness, the force with which it resists being driven into vibration at any given frequency by the groove modulation of the record. The least damage is believed to be done by pickups which have a high degree of compliance or deflectability in the radial direction of the record—that is crosswise of the pickup arm.[2]

The resonant frequencies of a pickup—and all pickups do have resonance points to some extent—are also important in producing record wear. Consumers' Research has already noted that for this reason it is advisable to use the same pickup on any given record at all times, so far as practicable. "Tracking error" of a pickup is another cause of wear, but probably not one of the major causes. The phonograph needle is carried by the pickup across the record at a slight angle from the vertical, and should theoretically move along a radius of the record, in such a way that its intended direction of vibration is at all times perpendicular to a tangent to the groove at the point of needle contact. With equipment now available, however, the needle does not move along a radius, and as it moves toward the center of the record, it is turned slightly. As the needle wears with playing—and all needles do wear—flat spots are formed which reflect the shape of the V-shaped groove in the record. As the needle is turned, due to the tracking error, the edges of these flat spots come into contact with the sides of the grooves and produce some cutting of the groove walls. (See Figure 2.) Authorities however do not agree on the practical importance of ordinary amounts of tracking error, and the general belief is that when the tracking error is not large (see CR BULLETIN, November 1946, in which actual tracking error of ten pickups is given), it is not important.

Table Showing Comparative Record Wear[1]

Record	*Approximate Number of Plays*					
	First Signs of Wear		Marked Wear		Very Great Wear	
	A	B	A	B	A	B
Columbia, shellac	100	60	200	100	over 300	300
Decca, shellac	—	25	—	40	—	60
Victor, shellac	70	35	160	70	200	125
Victor, plastic	40	—	100	—	155	—

[1]The two sets of observations shown in each column are for different selections tested under the same conditions as to needle type and needle pressure, but it will be noted that the number of plays at which wear of a given type is reported is roughly proportional. Column A shows observations made on Till Eulenspiegel; column B on Warsaw Concerto.

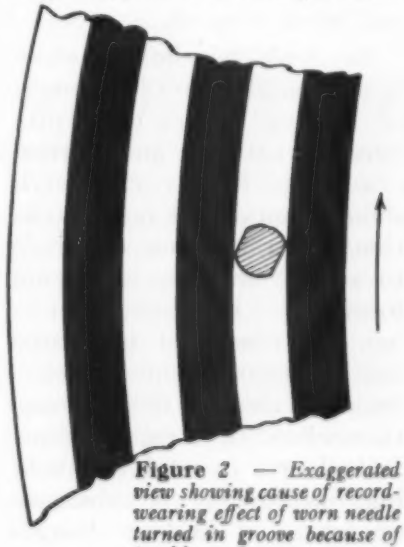


Figure 2 — *Exaggerated view showing cause of record-wearing effect of worn needle turned in groove because of tracking error.*

[1]Consumers' Research will be glad to mail on request 5 x 7 glossy-paper prints of the photograph at a charge of 75 cents each, to any subscribers who may be interested to examine the photographic record of wear test results.

[2]*Compliance* in engineering practice is the property of yielding to bending within the elastic limit. Thus a whalebone is a relatively *compliant* or soft spring; the prong of a tuning fork is relatively non-compliant or stiff.

New Catalogs and Commercial Literature Desired for CR's Files

Consumers' Research has a rather extensive catalog file, but changes during the war period and subsequently have made it desirable that this be brought up to date. In many fields there have been changes in the items available that have not always been reflected in new catalog leaflets and other literature, but this difficulty will no doubt be corrected in the reasonably near future.

CR will be glad to receive and file up-to-date catalogs in all fields of consumers' goods, and will be glad to have subscribers send in such catalog

literature when convenient, particularly circulars, etc., regarding items on which they would like CR to conduct tests. We would like to have literature on good items and also on fraudulent or near-fraudulent or misleadingly advertised specialties, appliances, and gadgets, such as battery rejuvenators, oil and gasoline dopes, and various carburetor and ignition accessories.

Consumers who have friends who are manufacturers either of "consumer goods" or of apparatus and instruments used in the testing of appliances and other articles, may, if they find it convenient, suggest that catalogs and exceptional data, etc., in these fields be sent to us (by mail, of course, rather than by visit of a sales or other representative of the firm, as there would not be time available to discuss the subject matter of the literature with company representatives).

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Fuel Oil

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THERE are mainly three grades of fuel oils sold for domestic use today—No. 1, No. 2, and No. 3. No. 1 is similar to kerosene; it is light in color and is usually what is known as a straight run oil. In essence this means it is obtained by a straight distillation process, in which the crude oil is heated gradually. As this heating continues, the various fractions are distilled out, first gasoline, then as the temperature increases, kerosene, followed by the heavier fuel oils and lubricating oil.

No. 2, which is the most widely used grade of oil for domestic heating, is now often produced by catalytic and thermal cracking; however, it still should contain a large proportion of straight-run materials to reduce smoking and gum formation. In thermal cracking the crude oil is heated under pressure; this "cracks" the molecules and they regroup themselves to form gasoline, fuel oil, etc. In catalytic cracking, introducing a substance known as a catalyst changes the type of molecule formed. With this method more gasoline and domestic fuel oil are produced from the crude oil than would be produced by the other methods already discussed.

No. 3 fuel oil is essentially the same as No. 2 except that it is darker and somewhat heavier. These initial processes are followed by refining to remove impurities. This refining reduces the tendency of the oil to form sediment, which would adversely affect the operation of the oil burner, etc. Many people, when they experience trouble with their oil burner or find they are burning too much oil, immediately place the blame on the quality of oil (which the layman is likely to consider as chiefly related to its heat value). While in some few cases the oil quality may be deficient, more often than not, the fault is one that lies with the heating equipment or in the way in which it has been maintained. The heat units per gallon (Btu. value) of present-day oil actually is pretty much the same as it was seven or eight years ago, and differs but little among the brands; even the difference between the 3 different grades in this respect is relatively unimportant.

CR has tested a number of different brands of fuel oil sold in the East and on the Pacific Coast. The tests included determinations of the following:

Flash point. This is important to determine if any contamination with gasoline is present. Tank trucks are often used interchangeably for both products and unless care in handling is exercised, contamination can easily occur and cause danger of explosion when the fuel is burned. Oil of too combustible nature has too low a flash point. On the other hand, the flash point must be low enough that the oil will supply enough combustible vapor to ignite readily when the burner is started at low temperatures. No. 1 oil is required to have a minimum flash point of 100°F or not less than the legal minimum, No. 2 and No. 3, 110°F or not less than the legal minimum, as set by the state in which the oils are sold.

Pour point. This is to determine the lowest temperature at which the oil will flow. The American Society of Testing Materials requires pour points of not more than 0°F for No. 1 oil, 10°F for No. 2, and 20°F for No. 3.

Water and sediment content. Any appreciable amount of sediment will tend to clog oil-burner spray nozzles.

Carbon residue. If this is high, the fuel will not burn clean, will deposit coke on the burner nozzle and soot in the combustion chamber, and on the surrounding houses and

countryside, as well.

Distillation range, gives a measure of the volatility or ease of starting of the burner as well as the amount of heavy residue in the oil, and includes the substances that are difficult to burn and may tend to clog the burner.

Tests were also made for specific gravity (by the American Petroleum Institute method) and the heat content in British thermal units per gallon was calculated. Ratings of all samples are based on their conformance with A.S.T.M. fuel oil specifications. Differences in heat content are shown as a matter of convenience for the reader, but were found to be too small in a percentage sense to affect oil consumption significantly. It should be noted that Western refiners have adopted their own specifications known as Pacific Specifications No. 100, 200, 300, and 400. All of the No. 1 stove oils met Pacific Specification No. 100 and all the No. 3 furnace oils met Pacific Specification No. 200.

Samples marked (E) were purchased in the East and those marked (PC) on the Pacific Coast.

No. 1 Stove Oils

A. Recommended

Caminol (PC) (Caminol Co.) Ranked third in heat content of the No. 1 oils tested (136,600 Btu.'s per gal.).

Mobilheat 100 (PC) (Socony-Vacuum Oil Co.) Ranked second in heat content of No. 1 oils (137,900 Btu.'s per gal.).

Shell (PC) (Shell Oil Co.) Ranked fourth in heat content (135,900 Btu.'s per gal.).

B. Intermediate

Standard (PC) (Standard Oil Co.) Ranked first in heat content of No. 1 oils (138,100 Btu.'s per gal.). Carbon residue slightly high.

No. 2 Furnace Oils

A. Recommended

Atlantic Medium (E) (Atlantic Refining Co.) Ranked lowest in heat content of No. 2 oils (137,300 Btu.'s per gal.).

Essoheat Medium (E) (Standard Oil Co. of N.J.) Ranked sixth in heat content (138,900 Btu.'s per gal.).

Socony (E) (Socony-Vacuum Oil Co.) Ranked third in heat content (140,500 Btu.'s per gal.).

Sun (E) (Sun Oil Co.) Ranked fourth in heat content (139,400 Btu.'s per gal.).

Texaco (PC) (Texas Co.) Ranked seventh in heat content of No. 2 oils (138,600 Btu.'s per gal.).

B. Intermediate

Amoco (E) (American Oil Co.) Ranked second in heat content of No. 2 oils (141,200 Btu.'s per gal.). Failed by small margin to meet A.S.T.M. Specifications.

Super Flame (E) (Sinclair Refining Co.) Ranked fifth in heat content (139,300 Btu.'s per gal.). Failed by small margin to meet A.S.T.M. Specifications.

Tidewater (E) (Tidewater Associated Oil Co.) Ranked first in heat content of No. 2 oils (141,500 Btu.'s per gal.). Failed by small margin to meet A.S.T.M. Specifications.

No. 3 Furnace Oils

A. Recommended

Associated (PC) (Tidewater Associated Oil Co.) Highest heat content of any No. 3 oil tested (141,300 Btu.'s per gal.).

Mobilheat 200 (PC) (Socony-Vacuum Oil Co.) Ranked fifth in heat content (140,600 Btu.'s per gal.).

Richfield (PC) (Richfield Oil Co.) Ranked sixth in heat content (139,600 Btu.'s per gal.).

Seaside (PC) (Seaside Oil Co.) Ranked seventh in heat content (139,300 Btu.'s per gal.).

Shell (PC) (Shell Oil Co.) Ranked eighth in heat content of No. 3 oils (139,100 Btu.'s per gal.).

Standard (PC) (Standard Oil Co.) Ranked second, with *Union*, in heat content (141,100 Btu.'s per gal.).

Union (PC) (Union Oil Co.) Ranked second, with *Standard*, in heat content (141,100 Btu.'s per gal.).

B. Intermediate

Sunland (PC) (Sunland Refining Corp.) Ranked fourth in heat content (140,700 Btu.'s per gal.). Failed on one count to meet A.S.T.M. Specifications.

A Discussion of "High Fidelity" Now Available

By kind permission of the publishers of the magazine RADIO, we have reproduced in reprint form an article on "High Fidelity," by A.C. Matthews, and shall be glad to make copies available at 25c to those of our readers who are interested in high fidelity in connection with the use, selection, and improvement of radio receivers and phonographs. Anyone who is contemplating the purchase or construction of equipment deemed suitable for high-fidelity reproduction of music on records or transmitted by radio will very probably find this article of distinct interest and value. There have been many letters about this question in recent months—even though radio-phonographs of high-fidelity grade have been very scarce and practically unobtainable under a figure fairly close to $1000—and we have prepared this reprint because it affords material basic to an understanding of the problem. This article will be useful to anyone who wishes to have the background information necessary to an understanding of the problems related to the faithful and pleasing (high-fidelity) reproduction of music, either broadcast, or as reproduced from records.

Off the Editor's Chest

[*Continued from page 2*]

prices, the prices of eggs and milk.

In a speech made in Des Moines, Iowa, while he was chief administrator of the Office of Price Administration, Chester Bowles is reported to have set forth a formula for post-war prosperity along these lines: Not only must high prices be maintained for farm products, but the farmer must be able to sell a sufficient volume of those products to enable him to maintain a reasonably high standard of living. Such an achievement, according to Mr. Bowles, was possible only if industrial employment was maintained at a high level. But we have had industrial employment at its highest levels in history—except for some prolonged voluntary abstentions from work known as strikes—along with extremely high prices for farm products, and yet nearly everybody feels poor. People complain and with much justice that most of their income goes for food and the bare necessities of daily living. Obviously something is wrong with Mr. Bowles' formula, and with his highly synthetic and unstable type of "prosperity."

More recently, on reports of the urgent need of various European countries for wheat, the government stepped into the grain market and made such extensive purchases that the price of wheat soared to $3.05 a bushel, almost a record high. This naturally pushes up the price of all foods made from or containing wheat, including bread, breakfast cereals, and a host of other products. Again the government's methods contribute to increasing the already too high cost of living.

As a matter of fact, well informed financial experts point out that heavy exports of food will add billions of dollars to the home grocery bills; it is obvious to all except those of the ultramodern schools of economic thought that such a result *must* follow. The majority of people in the United States apparently favor sharing their food with the less fortunate abroad. They must, however, realize that the more food is exported the less there will be left at home, and consequently the higher the prices which they will of necessity pay to supply their own tables. There is *no way to give the food away abroad, and at the same time to have it available at a low price at home.* Since the world's need for food at the present time is seemingly almost limitless, taxpayers will need to give serious thought to how large a financial commitment they are willing to permit their official servants to undertake in this respect and how far they wish to go in increasing their own living costs in order to reduce costs of living and improve living standards in Europe and Asia.

With the Department of Agriculture actively working to keep prices for farm products high and with tremendous tonnages of food to be supplied in an effort to fill world-wide shortages, it is obvious that the cost of supplying the family groceries will not be reduced in the near future. Nothing that food manufacturers or dealers do can have any significant effect on the problem so long as the government continues its present policies with respect to American food resources. Whether food prices do come down will depend largely on what action is taken by consumers to put themselves on record where it counts, to show their approval or disapproval of the Department of Agriculture's policies on prices and to indicate how high they are willing to let their own food expenditures go in order to permit supplying of foods to other countries throughout the whole world.

Abridged Cumulative Index of Previous 1947 Issues Consumers' ResearchBulletins

Month and Page

Automobile taxes ... Mar., 4
Automobiles, extra equipment charges ... Mar., 25
'47, similar to '46 ... Mar., 3
production difficulties ... Mar., 4, 37
station wagons, popularity† ... Apr., 3
steam† ... Mar., 11-13
Tucker Torpedo† ... Apr., 8-9
used, sales ... Jan., 4
Willys 1947 6-cylinder† ... Apr., 7-8

Batteries, storage, care ... Jan., 4; Mar., 37
Battery chargers, automobile† ... Jan., 12-15
Beater, electric (Whirlbeater)† ... Mar., 37
Binocular (Trojan)† ... Feb., 16-17
Blankets, comforter, electric† ... Feb., 8-11
Bottle opener (Cap-Off)† ... Feb., 29

Cameras, folding hand, and stereo† ... Feb., 14-15
foreign, production ... Jan., 29-30
motion picture, surplus ... Feb., 29
shutters, repair service ... Mar., 4
Cancer, skin, ways to help avoid ... Apr., 3-4
Carrots, reported not good source of vitamin A ... Apr., 3
Cleaner, floor (Bruce)† ... Jan., 30
furniture (Ultra Gloss)† ... Feb., 7
household (Ethyl)† ... Apr., 30
paint brush (Prestorer)† ... Feb., 30
Cleanser, household (Miner's)† ... Mar., 38
Corrections and emendations† ... Jan., 22; Mar., 21
Correspondence with CR ... Jan., 17; Mar., 10

Diseases, respiratory, smoky cities ... Apr., 30

Editorial ... each issue, page 2

Fabrics, highly flammable ... Apr., 3
Fans, electric† ... Apr., 9
Fire extinguishers—II† ... Jan., 18-21
Fluorescent lamps ... Jan., 3; Feb., 5-7†
Food, for fever patients ... Apr., 4
Foods, undesirable qualities ... Apr., 29
Fountain pens† ... Feb., 17-18
Furniture polish (Cellowax)† ... Apr., 30

Gasket cement (Form-A-Gasket)† ... Mar., 38

Headache powders (BC and Stanback), harmful ingredients eliminated† ... Mar., 3
Heating equipment, domestic, post-war status† ... Mar., 22-25
automatic controls† ... Apr., 13-16
clinker prevention ... Apr., 10-11

Jewelry, wording of advertising claims ... Apr., 4

Killing germs with lamps† ... Feb., 19-24

Motion pictures† ... each issue
Motor oils, winter† ... Jan., 24-25

Phonograph pickups† ... Jan., 23
Phonograph records† ... each issue

Radio receiver for the deafened† ... Jan., 26
Radio-phonograph combination† ... Jan., 25
Radio-phonographs, high-priced, plans for tests ... Feb., 26
Radios, table-models and radio-phonographs, etc. ... Feb., 3; Mar., 13†; Apr., 23-25†
record noise, new eliminator† ... Apr., 4
Razor blade, new (Durex)† ... Apr., 18
Room-heaters, portable electric† ... Jan., 5-8; Apr., 19-23

Soap and soap powders, rackets ... Apr., 29
Soaps, laundry† ... Jan., 15-17
Socks, men's† ... Jan., 9-11
Step-stools, kitchen† ... Apr., 5-7
Sunlamps† ... Mar., 28-33

Table stoves, electric† ... Apr., 16-18
Tire and tube, new† ... Feb., 12
Toasters, automatic† ... Apr., 11-13

Vacuum cleaners† ... Mar., 5-10
Vitamins ... Feb., 4; Mar., 3, 4

Washing machines† ... Mar., 14-21
Launderall (preliminary)† ... Feb., 15

†Indicates that listings of names or brands are included.

Ratings of Motion Pictures

THIS section aims to give critical consumers a digest of opinion from a wide range of motion picture reviews, including the motion picture trade press, leading newspapers and magazines—some 19 different periodicals in all. The motion picture ratings which follow thus do not represent the judgement of a single person, but are based on an analysis of critics' reviews.

The sources of the reviews are:

Box Office, Charm, Chicago Daily Tribune, The Christian Century, Cue, Daily News (N.Y.), *The Exhibitor, Harrison's Reports, Motion Picture Herald, National Legion of Decency List, Newsweek, New York Herald Tribune, New York Times, Parents' Magazine, Release of the D.A.R. Preview Committee, Successful Farming, Time, Variety* (weekly), and *Unbiased Opinions of Current Motion Pictures* which includes reviews by the General Federation of Women's Clubs, the American Legion Auxiliary, National Film Music Council, and others.

The figures preceding the title of the picture indicate the number of critics who have been judged to rate the film A (recommended), B (intermediate), and C (not recommended) on its entertainment values.

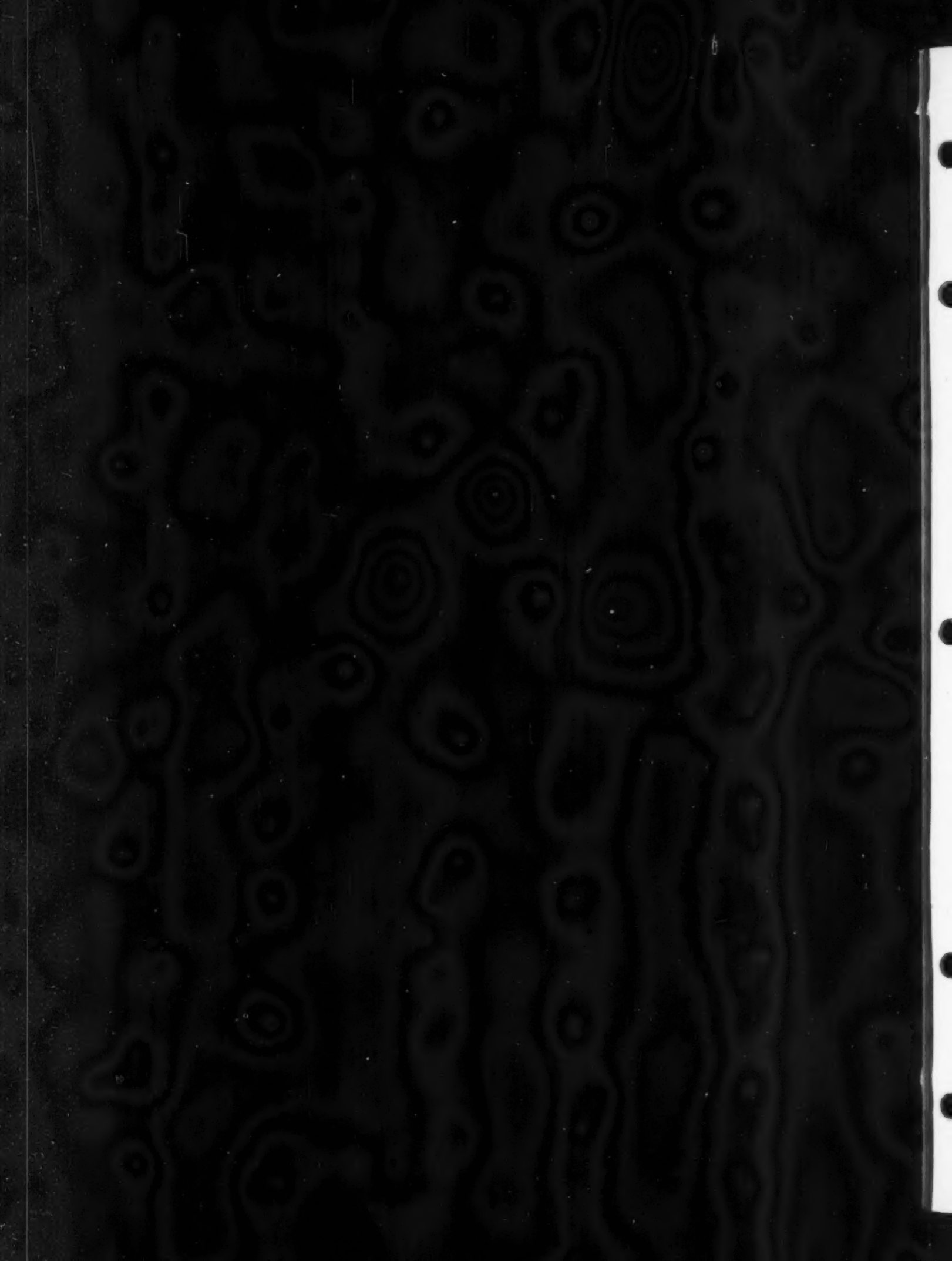
Audience suitability is indicated by "A" for adults, "Y" for young people (14-18), and "C" for children, at the end of each line.

Descriptive abbreviations are as follows:

adv—adventure
biog—biography
c—in color (Technicolor, Cinecolor, Trucolor, or Magnacolor)
car—cartoon
com—comedy
cri—crime and capture of criminals
doc—documentary
dr—drama
fan—fantasy
hist—founded on historical incident
mel—melodrama
mus—musical
mys—mystery
nov—dramatization of a novel
rom—romance
soc—social-problem drama
trav—travelogue
war—dealing with the lives of people in wartime
wes—western

A	B	C		
2	2	10	**Abie's Irish Rose**	*com AYC*
—	—	5	**Accomplice**	*cri-mel A*
1	4	—	**Adventuress, The**	*war-mel A*
—	—	7	**Affairs of Geraldine**	*mus-com A*
—	2	5	**Alias Mr. Twilight**	*cri-mel A*
—	5	2	**Angel and Sinner**	*dr A*
—	9	2	**Angel and the Badman**	*wes AYC*
1	8	8	**Angel on My Shoulder**	*fan A*
—	2	3	**Appassionata**	*mus-dr A*
—	6	1	**Arnelo Affair, The**	*mys-mel A*
—	8	8	**Bachelor's Daughters, The**	*mus-com A*
—	4	5	**Bamboo Blonde, The**	*mus-war-rom A*
—	2	12	**Beast with Five Fingers, The**	*cri-mel A*
—	2	5	**Beat the Band**	*mus-com A*
—	1	2	**Beauty and the Bandit**	*wes AYC*
—	8	3	**Bedelia**	*cri-dr A*
—	5	3	**Before Him All Rome Trembled**	*war-mus-dr A*
3	8	4	**Beginning or the End, The**	*war-dr AYC*
—	4	4	**Below the Deadline**	*mel A*
9	5	1	**Best Years of Our Lives, The**	*war-dr A*
—	1	6	**Betty Co-ed**	*mus-com A*
—	2	3	**Big Town**	*dr A*
—	5	5	**Blaze of Noon**	*dr AYC*
—	2	3	**Blind Spot**	*mys-mel A*
—	4	5	**Blondie Knows Best**	*com AYC*
—	3	3	**Blondie's Big Moment**	*com A*
—	2	3	**Blondie's Holiday**	*com AYC*
1	15	4	**Blue Skies**	*mus-biog-c A*
1	10	—	**Boomerang**	*cri-mel A*
—	—	5	**Born to Speed**	*mel AYC*
—	1	6	**Boston Blackie and the Law**	*cri-mel AY*
—	2	2	**Boy! What a Girl**	*mus-com AY*
—	6	2	**Brasher Doubloon, The**	*mys-mel A*
—	1	2	**Bridge of Sighs**	*mel A*
—	3	3	**Bringing Up Father**	*com AY*
—	1	6	**Brute Man, The**	*cri-mel A*
—	4	1	**Buck Privates Come Home**	*com AYC*
—	2	1	**Cage of Nightingales, A**	*dr A*
—	4	3	**Calendar Girl**	*mus-com AY*
1	9	4	**California**	*wes-c A*
1	6	1	**Carmen**	*dr A*
—	3	2	**Carnegie Hall**	*mus-dr A*
—	5	9	**Chase, The**	*cri-mel A*
—	5	4	**Child of Divorce**	*dr A*
1	7	3	**Children of Paradise**	*dr A*
—	—	6	**Cigarette Girl**	*mus-com A*
—	1	3	**Clandestine**	*war-dr A*
—	2	3	**Code of the West**	*wes AYC*
—	3	—	**Conquest of Cheyenne**	*wes AYC*
—	2	7	**Crime Doctor's Manhunt**	*mys-mel A*
—	—	5	**Danger Street**	*cri-mel A*
—	4	6	**Dangerous Millions**	*cri-mel AYC*
—	1	5	**Dangerous Money**	*mys-mel AYC*
—	1	3	**Dangerous Venture**	*wes AYC*
2	10	3	**Dark Mirror, The**	*mys-mel A*
—	7	10	**Dead Reckoning**	*mel A*
—	2	2	**Death Valley**	*mel-c AYC*
—	9	7	**Deception**	*dr A*
—	3	5	**Decoy**	*mel A*
1	—	4	**Devil on Wheels, The**	*mel AYC*
—	5	2	**Devil Thumbs a Ride, The**	*mel A*
—	3	2	**Devil's Hand, The**	*fan A*
—	5	1	**Devil's Playground, The**	*wes AYC*
—	4	3	**Dick Tracy versus Cueball**	*mel A*
—	—	3	**Don Ricardo Returns**	*rom-dr A*
—	3	1	**Driftin' River**	*mus-wes AYC*
3	3	3	**Duel in the Sun**	*wes-c A*
—	2	11	**Easy Come, Easy Go**	*com A*
—	3	—	**Extenuating Circumstances**	*cri-com A*
—	6	3	**Fabulous Dorseys, The**	*mus-biog AYC*
—	5	2	**Fabulous Suzanne, The**	*com A*
—	2	7	**Falcon's Adventure, The**	*cri-mel AYC*
—	2	2	**Fall Guy**	*mys-mel AY*
1	4	—	**Farmer's Daughter, The**	*com A*
—	6	—	**Fear in the Night**	*cri-mel AY*
—	1	2	**Fighting Frontiersman, The**	*wes AYC*
1	4	1	**Fool's Gold**	*wes AYC*
—	4	1	**Framed**	*mel A*
—	3	—	**Francis the First**	*fan AY*
1	6	6	**Gallant Bess**	*war-dr-c AYC*
—	4	12	**Gallant Journey**	*dr A*
—	2	3	**Gas House Kids**	*mel AYC*
—	2	1	**Genius and the Nightingale, The**	*dr A*
—	6	2	**Gentleman Joe Palooka**	*com A*
—	1	2	**Ginger**	*dr AYC*
1	1	3	**Guilt of Janet Ames, The**	*dr A*
—	2	1	**Gunman's Code**	*wes AYC*
—	4	2	**Heldorado**	*mus-wes AYC*
—	2	4	**Her First Affair**	*dr A*
—	6	7	**Her Sister's Secret**	*war-dr A*
—	4	1	**High Barbaree**	*dr AYC*
—	3	—	**High Conquest**	*adv A*
—	7	—	**Home in Oklahoma**	*mus-wes AYC*
1	8	9	**Humoresque**	*mus-dr A*
—	4	1	**I Cover Big Town**	*cri-mel A*
—	3	1	**I Know Where I'm Going**	*dr A*
—	3	1	**I Live as I Please**	*mus-dr AYC*
—	4	8	**If I'm Lucky**	*mus-com A*
—	7	7	**I'll Be Yours**	*mus-com A*
—	2	3	**Imperfect Lady, The**	*dr A*
—	—	6	**Inner Circle, The**	*cri-mel A*
—	—	6	**Invisible Informer**	*cri-mel A*

A	B	C		
2	7	—	**It Happened in Brooklyn**	*mus-com AYC*
—	7	—	**It Happened on Fifth Avenue**	*mus-dr A*
—	3	4	**It's a Joke, Son!**	*com A*
7	8	1	**It's a Wonderful Life**	*dr AY*
—	2	7	**It's Great to be Young**	*mus-com AY*
—	4	3	**Ivan the Terrible**	*hist-dr A*
2	5	6	**I've Always Loved You**	*mus-dr-c A*
2	5	—	**Jericho**	*war-dr A*
1	6	3	**Johnny Frenchman**	*war-dr A*
—	6	3	**Johnny O'Clock**	*mys-mel A*
5	9	1	**Jolson Story, The**	*mus-biog-c AY*
—	1	4	**Jungle Flight**	*dr A*
—	2	7	**Ladies' Man**	*com A*
—	1	3	**Lady Chaser**	*mel AY*
1	13	1	**Lady in the Lake**	*cri-mel A*
—	4	—	**Lady Surrenders, A**	*rom A*
—	2	3	**Landrush**	*mus-wes AYC*
2	7	2	**Late George Apley, The**	*nov A*
—	—	4	**Law of the Lash**	*wes AYC*
—	2	2	**Lawless Breed**	*mus-wes AYC*
—	1	2	**Lighthouse**	*dr A*
—	2	5	**Little Iodine**	*com A*
—	4	3	**Little Miss Big**	*dr AYC*
—	8	8	**Locket, The**	*mel A*
—	—	3	**Lone Hand Texan, The**	*mus-wes AYC*
—	1	2	**Lone Star Moonlight**	*mus-wes A*
—	2	5	**Lone Wolf in Mexico, The**	*mys-mel A*
—	4	1	**Lost Honeymoon**	*com AY*
—	8	5	**Love Laughs at Andy Hardy**	*mus-com AY*
—	2	3	**Macomber Affair, The**	*dr A*
—	3	1	**Magic Bow, The**	*mus-nov AYC*
1	10	5	**Magnificent Doll, The**	*hist-dr A*
—	1	2	**Magnificent Rogue, The**	*com A*
—	1	5	**Man from Morocco, The**	*mel A*
—	6	8	**Man I Love, The**	*mus-mel A*
—	5	5	**Man's Hope**	*war-dr A*
3	11	2	**Margie**	*com-c AY*
—	4	3	**Michigan Kid**	*wes-c AYC*
—	7	1	**Mighty McGurk, The**	*dr AYC*
—	—	4	**Millie's Daughter**	*dr A*
—	—	4	**Missing Lady, The**	*mys-mel A*
—	6	4	**Mr. District Attorney**	*cri-mel A*
—	5	1	**Mr. Hex**	*mel AYC*
—	6	1	**Murder in Reverse**	*cri-mel A*
—	5	2	**My Brother Talks to Horses**	*com AYC*
2	13	1	**My Darling Clementine**	*wes AYC*
1	9	—	**My Favorite Brunette**	*com AY*
—	3	—	**Navajo Trail, The**	*wes AYC*
—	6	7	**Never Say Goodbye**	*com A*
—	9	7	**No Leave, No Love**	*mus-com AY*
—	5	8	**Nobody Lives Forever**	*cri-mel A*
1	4	11	**Nocturne**	*mus-mel AY*
—	3	10	**Nora Prentiss**	*dr A*
2	11	4	**Notorious Gentleman**	*war-dr A*
1	3	2	**Odd Man Out**	*dr A*
—	4	2	**Out California Way**	*mus-wes-c AYC*
—	—	4	**Outlaw of the Plains**	*wes AYC*
—	—	3	**Over the Santa Fe Trail**	*mus-wes AYC*
—	1	4	**Overland Riders**	*wes AYC*
2	8	2	**Overlanders, The**	*dr AYC*
—	3	2	**Paris Frills**	*dr A*
—	6	8	**Perfect Marriage, The**	*com A*
—	—	5	**Phantom Thief, The**	*cri-mel A*
—	3	4	**Pilgrim Lady, The**	*com A*
—	7	3	**Plainsman and the Lady, The**	*wes AY*
—	3	7	**Private Affairs of Bel Ami, The**	*dr A*
—	8	2	**Pursued**	*wes A*
1	1	2	**Queen for a Night**	*mus-rom A*
2	4	—	**Raider, The**	*war-doc AY*
—	1	2	**Raiders of the South**	*mus-wes AYC*
1	4	1	**Ramrod**	*wes A*
—	3	1	**Range Beyond the Blue**	*mus-wes AYC*
1	11	5	**Razor's Edge, The**	*dr A*
—	11	1	**Red House, The**	*cri-dr A*
—	2	1	**Renegade Girl**	*mel A*
—	6	5	**Return of Monte Cristo**	*mel A*
—	1	2	**Riding the California Trail**	*wes AYC*
—	6	1	**Roll On Texas Moon**	*mus-wes AYC*
—	2	1	**Rolling Home**	*dr AYC*
—	4	1	**Rustler's Roundup**	*wes AYC*
—	5	9	**San Quentin**	*mel A*
—	7	7	**Sea of Grass**	*wes-dr A*
1	10	5	**Secret Heart, The**	*mus-mel AY*
—	1	6	**Secret of the Whistler**	*mys A*
—	2	4	**Seven Were Saved**	*war-mel A*
—	5	6	**Shadow of a Woman**	*cri-mys A*
—	2	5	**Shadowed**	*mys-mel A*
—	—	3	**Shadows on the Range**	*wes AYC*
—	9	4	**Shocking Miss Pilgrim, The**	*mus-com-c AY*
—	12	3	**Show-Off, The**	*com AYC*
—	1	3	**Silver Range**	*wes AYC*
—	5	—	**Sin of Harold Diddlebock, The**	*com A*
—	11	3	**Sinbad the Sailor**	*adv-c AYC*
—	1	6	**Singin' in the Corn**	*mus-com AYC*
—	2	2	**Singing on the Trail**	*mus-wes AYC*
1	6	—	**Sioux City Sue**	*mus-wes AYC*
1	7	1	**Smash Up — The Story of a Woman**	*mus-dr A*
—	5	5	**So Dark the Night**	*mel A*
1	5	8	**Song of Sheherazade**	*mus-dr-c AY*
—	—	3	**Song of the Sierras**	*mus-wes AYC*
1	10	3	**Song of the South**	*car-c AYC*
—	3	1	**South of the Chisholm Trail**	*wes AYC*
—	2	4	**Stage Coach to Denver**	*wes AYC*
3	10	—	**Stairway to Heaven**	*fan-c A*
—	2	1	**Stallion Road**	*dr A*
—	1	3	**Stars Over Texas**	*mus-wes AYC*
—	5	3	**Stone Flower**	*fan-c AYC*
—	4	—	**Story of the Pope, The**	*doc AYC*
—	1	5	**Strange Holiday**	*mel A*
—	—	8	**Strange Journey**	*mel A*
1	5	8	**Strange Woman, The**	*dr A*
—	8	5	**Suddenly It's Spring**	*com A*
—	2	4	**Susie Steps Out**	*mus-com A*
—	4	3	**Sweetheart of Sigma Chi**	*mus-com A*
1	6	10	**Swell Guy**	*dr A*
—	2	4	**Taras Family, The**	*war-dr A*
—	4	13	**Temptation**	*cri-mel A*
—	2	1	**Terror Trail**	*wes AYC*
—	3	8	**That Brennan Girl**	*mel A*
—	3	6	**That Way With Women**	*com AY*
1	12	3	**13 Rue Madeleine**	*war-mel AYC*
—	2	2	**Thirteenth Hour, The**	*cri-mel AY*
1	1	1	**This Happy Breed**	*dr AY*
4	11	3	**Till the Clouds Roll By**	*mus-biog-c AY*
—	8	7	**Time, the Place, and the Girl, The**	*mus-com-c A*
—	4	1	**Trail Street**	*mus-wes AYC*
—	2	2	**Trail to San Antone**	*mus-wes AYC*
—	—	6	**Trap, The**	*mys-mel A*
—	—	5	**Tumbleweed Trail**	*mus-wes AYC*
—	4	2	**Turning Point, The**	*war-dr A*
—	4	1	**Under Nevada Skies**	*mus-wes AYC*
—	4	—	**Undercover Maisie**	*com A*
2	8	6	**Undercurrent**	*mel A*
—	4	3	**Unexpected Guest**	*wes AY*
—	3	7	**Vacation in Reno**	*com A*
—	1	2	**Valley of Fear**	*wes AYC*
—	1	10	**Valley of the Zombies**	*cri-mel A*
—	12	4	**Verdict, The**	*cri-mel A*
—	3	1	**Vigilantes of Boomtown**	*wes AYC*
—	3	10	**Wake Up and Dream**	*mus-fan-c AYC*
—	7	7	**Wanted for Murder**	*cri-mel A*
3	7	1	**Welldigger's Daughter, The**	*dr A*
—	—	5	**West of the Alamo**	*mus-wes AYC*
—	6	7	**White Tie and Tails**	*com A*
—	7	11	**Wicked Lady, The**	*dr A*
—	—	7	**Wife Wanted**	*cri-mel A*
—	—	4	**Wild Country**	*mus-wes AYC*
—	3	1	**Wild West**	*mus-wes-c AYC*
—	2	1	**Yank in Rome, A**	*war-dr A*
7	10	—	**Yearling, The**	*dr-c AYC*
—	7	5	**Years Between, The**	*nov A*
—	—	3	**Youth Aflame**	*dr A*



The Consumers' Observation Post

(Continued from page 4)

taining "milk and lanolin for reconditioning of hair." An analysis of this product indicated that it consisted of sulfated organic detergent (soap substitute) of a type similar to Duponol WA, 23%; glycerol monostearate, 9%; stearic acid, 1%; and the remainder (approximately 67%), water. Perfume to the extent of several percent was also found, together with a very small amount of lanolin (half of one percent or less). Essentially the product is to be classed as a shampoo of the creme type with no special "conditioning" properties.

Tukor Machine Dishwashing Compound No. 32 (Tukor Products, Inc., 350 Madison Ave., New York City) is priced at 6-3/4 cents per pound, in 350-lb. drums, and is sold for use with commercial and institutional dishwashing machines. The amount used is 3/4 cupful for each 20 gallons of wash tank capacity. Analysis of the compound indicated the following composition: 1.9% sodium chloride, 14.3% trisodium phosphate, 26% sodium silicate, 1.5% sulfonated synthetic detergent, 14.4% sodium carbonate, 32.4% sodium bicarbonate, and 9.5% water of hydration.

Quickee Waterless Hand Cleaner (Tudor Chemical Co., Inc., New York City) was recently analyzed and found to consist of 24% Stoddard Solvent (a high flash point petroleum naphtha of a kind much used for dry cleaning), 45% light mineral oil, 8% ammonium stearate soap, with 1-1/2% lanolin and vegetable oil, the remainder being water—21.5%. It is well known that the use of petroleum solvents on the hands is an undesirable method of washing, for they have a drying effect on the skin because of too drastic removal of natural skin fats and oils. It would seem therefore that this material would not be desirable for use in washing grimy hands.

Twinlenz Viewer (Craftsman Guild, 6916 Ruman St., Hollywood 38, Calif.) for which the demand is said to be "tremendous" is now being marketed. Its

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advertising claims that it "achieves a sensational stereoscopic effect using only one slide." Experts in stereoscopic photography know quite well that occasionally an illusion of relatively "stereoscopic effect" can be obtained by viewing a single picture. The effect is sometimes secured by projecting a single Kodachrome picture on a screen. With a particular type of picture, especially one having a fairly large object, such as a tree, in the foreground, the illusion of stereoscopic vision is more likely to occur. Nevertheless, such an effect is not stereoscopic viewing. A true stereoscopic picture with two views taken with two matched lenses separated by a distance about equal to the distance between the eyes, gives an effect which is quite different, and, of course, incomparably better than that from any alleged device for viewing a single picture stereoscopically.

Super Suds (23c for 1 lb. 8 oz. box), according to a recent analysis, is somewhat different in its constituents than it was when a test of built laundry soaps was made in 1944. In the later analysis, Super Suds was found to be a soap and builder mixture containing 9% of moisture; 56% of soda soap (having 8.5% of rosin in the fatty matter); 1.3% unsaponifiable matter; and approximately 4% of sodium chloride (salt). The builder consisted of the following: soda ash, 8%; sodium bicarbonate, about 7%; sodium silicate (waterglass), 8%; tetrasodium pyrophosphate, 0.83%. The alcohol-insoluble matter, corresponding to the builder present, amounted to 21.3%, which was about half the amount contained in the earlier sample. Thus the later product did not contain nearly as much builder as the previous sample. The important differences from the previous analysis are chiefly with respect to the alcohol-insoluble matter and the presence of rosin in the later sample. On the present analysis, Super Suds would rate as a B soap in the class known as Flake, Chip, and Bead Soaps with Builders and Fillers. The price per pound of actual soap content was 22c, which puts it in the low-priced or price group 1 for this class of soap product.

Bac-Trol (Blue Label), a typical pine oil disinfectant, was found on chemical analysis to consist of about 8% water, 11.5% soap, and 81% pine oil. Pine oil is definitely bactericidal, but, authorities say, is not a satisfactory disinfectant against Staphylococcus aureus and it is, therefore, not a suitable material for use around hospitals or in disinfection of wounds. The description of Bac-Trol as an "ideal" disinfectant is an exaggeration, as there is unfortunately no disinfectant which falls into the class of an ideal material.

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PHONOGRAPH RECORDS

By Walter F. Grueninger

Please Note: Prices quoted do not include taxes. In the ratings AA indicates highly recommended; A, recommended; B, intermediate; C, not recommended.

ORCHESTRA

De Falla: *El Amor Brujo.* 6 sides.
Hollywood Bowl Symphony under Stokowski with Nan Merriman (mezzo-soprano). Victor Set 1089. $3.85.
Interpretation AA
Fidelity of Recording AA

Pittsburgh Symphony Orchestra under Reiner with Carol Brice (contralto). Columbia Set 633. $4.
Interpretation B
Fidelity of Recording AA

Passionate Andulusian ballet music in which four numbers are sung. Stokowski and Miss Merriman exhibit the flair and fire for this music lacking in their competitors. Stokowski's recording reveals room resonance, giving the impression of a hall, whereas his competitor's recording, well forward, gives us more detail but less coherence. Stokowski's performance wins easily.

CONCERTO

Chopin: *Concerto No. 2.* Rubinstein (piano) and the NBC Symphony Orchestra under Steinberg. (7 sides) and *Berceuse in D Flat* (Op. 57) (1 side). Victor Set 1012. $4.85. The magic of Rubinstein's fingers nearly hides the many weaknesses of the concerto. Tops competitors.
Interpretation AA
Fidelity of Recording AA

CHAMBER AND INSTRUMENTAL

Chopin: *Sonata in B Flat Minor.* Rubinstein (piano). 6 sides, Victor Set 1082. $3.85. A great work. Commendable performance excepting for mannerisms, particularly in the "Funeral March." Exceptional recording. Tops competition.
Interpretation A
Fidelity of Recording AA

Debussy: *Pour le Piano* (3 sides) & *Danse* (1 side). Gaby Casadesus (piano). Vox Set 617. $2.85. First American recording of this interesting suite. Expert performance, good recording, satisfactory surfaces. Of its kind, an outstanding set.
Interpretation AA
Fidelity of Recording A

Debussy: *Preludes—Book II.* Robert Casadesus (piano). 12 sides, Columbia Set 644. $5.25. The music is less effective than "Book I." Superbly played, challenging Gieseking's Columbia Set 382 which offers noisier surfaces and less realistic recording.
Interpretation AA
Fidelity of Recording A

Haydn: *Quartet,* Op. 74, No. 3 ("The Horseman"). Budapest String Quartet. 4 sides, Columbia Set X274. $3. A favorite played with zest. The recording is "edgy" and some detail is lost.
Interpretation AA
Fidelity of Recording B

Piano Music of Russian Masters. Cherkassky (piano). 8 sides, Vox Set 165. Short compositions by Glinka, Rebikov, Tschaikowsky, Liadov, Khatchaturian, Prokofieff, etc., in the connoisseur class. Robust performance, satisfactory recording except for wavering pitch on some sustained notes. Several surfaces are noisy.
Interpretation AA
Fidelity of Recording A

Scarlatti: *Sonatas.* Sylvia Marlowe (harpsichord). 6 sides, Musicraft Set 72. $3.85. Nine little gems from this 18th century composer's collection of 545 "sonatas." Played with insight, though occasional pounding is disturbing. Well recorded on quiet surfaces. Inner grooves of side 6 waver in pitch.
Interpretation A
Fidelity of Recording AA

VOCAL

Bach: *Arias.* Marian Anderson (contralto). 6 sides, Victor Set 1087. $3.85. Uninspired arias from four church cantatas and one masterpiece from "St. Matthew's Passion." The obligato oboe is well recorded, the violin poorly recorded; the voice, though clear, lacks the room resonance of the instruments. Miss Anderson is not at her best.
Interpretation A
Fidelity of Recording A

Bowles: *Night Without Sleep* and Other Songs. Romolu de Spirito (tenor). 6 sides, Disc Set 730. $3.75. Modern art songs for the connoisseur.
Interpretation B
Fidelity of Recording B

Handel: *The Messiah.* Baillie, Ripley, Johnston, Walker (soloists). Huddersfield Choral Society, Liverpool Philharmonic Orchestra under Malcolm Sargent. 38 sides, Columbia Set 666 (2 volumes). $22.50. "A complete concert performance" of a major sacred work now in its third century. No important omissions from the score. The recording, made in thirteen sessions at the Huddersfield Town Hall in the north of England, during July 1946, reveals wide range, fine balance between soloists, chorus and orchestra, plus depth, body, concert hall atmosphere. The performance, as in all works of this size, presents a soloist or two who could be strengthened; a few tempi are subject to question, but on the whole it is most satisfactory. Particularly since no other recording is now catalogued, the set is thrice welcome. (Beecham's decade-old Columbia Set 271 offered a robust performance far less effectively recorded.) Let us hope this is the first of a string of English Columbia sets highly praised abroad which American Columbia will soon press here, giving consumers the benefit of the best foreign masters at low, domestic prices.
Interpretation AA
Fidelity of Recording AA

A Program of Songs by Chaliapin (bass). 6 sides, Compass Set 52. $3.75. These performances were never released here before now. Disks manufactured in USSR. Dramatic singing by a great artist of "How the King Went Forth to War," "Song of the Volga Boatman," "O You Vanya," etc. Recorded about a quarter of a century ago, under standards far below those of today.
Interpretation AA
Fidelity of Recording C

LIGHT, FOLK, AND MISCELLANEOUS

Music of Jerome Kern. Johnny Mercer, Martha Tilton, The King Cole Trio, The Pied Pipers, Peggy Lee, etc. (singers and instrumentalists). 8 sides, Capitol Set CD41. $3.65. The performance of these tunes calls for more polish than I find in this "group of foremost recording stars," as the blurb describes it.
Interpretation B
Fidelity of Recording AA

Artie Shaw Plays Cole Porter. 8 sides, Musicraft Set S2. $3.75. Adroitly arranged and performed dance music. The singers, however, add little. Recorded with more bass than usual.
Interpretation A
Fidelity of Recording AA

Calypso, Vol. 2. Macbeth, Duke of Iron, Lord Invader. 6 sides, Disc Set 628. $3. Although more than two sides at a time become monotonous, the three calypso singers presented here are among the best.
Interpretation AA
Fidelity of Recording AA

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Contents

Our Meat-Eating Ancestors	Chapter I
Abundance of Meat: The American Heritage	II
Why We Eat Less Meat Than Our Ancestors	III
The Healing and Health Values of Meat	IV
The Need for Protein	V
Meat or Vegetables	VI
Less Sugar and Starch for Better Health	VII
Feed and Forage for Animals — Meat for Consumers	VIII
Where Meat is Real	IX
Meat on the Table: How to Buy and How to Cook It	X
Better Eating for America	XI

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PAGE 38.

What the book said:

. . . a well-selected diet high in meat can fortify and strengthen the family against many illnesses, and act as insurance for strength and well-being. (p. 53)

. . . a high protein or meat diet is often an effective reducing measure for the obese, who are usually heavy eaters of cereal or starch and sweet foods. (p. 55)

One of the most effective creators of hemoglobin, the red coloring matter of the blood that is an index to health, is the high-quality protein of meat, particularly red meat such as that of rare roast beef and steak. (p. 144)

A series of brilliant experiments developed the importance of meat as a substance uniquely able to protect the body against toxins, such as those due to certain diseases, and those produced by the use of tobacco and alcohol. (p. 177)

. . . striking experiments . . . with the feeding of cats indicated that when they were fed insufficient quantities of raw meat, beef, and liver, male kittens lost their virility and took on definite homosexual characteristics, while the females became neuter in their reactions. (p. 178)

Though we pride ourselves on our magnificently equipped maternity hospitals and the great skill of our obstetric physicians, we have been laggard in appreciating the importance of proper diet as determining the health of mother and child. Protein deficiencies, it is now known, are common among expectant mothers. (p. 180)

If we do not eat meat, and a lot of it, much of the great supply of natural feeding stuffs in the country will go to waste, for cattle, hogs, and sheep consume enormous quantities of vegetable matter so very low in their content of nutrients usable by the human digestive system, that they would otherwise make no contribution to the American food supply whatever. (p. 182)